RAILROAD GAZETTE

FRIDAY, MAY 1.

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Contributions.

Compound Locomotives in Russia.

BORISOGLEBSK, TAMBOFF GOVERNMENT, Russia, April 11, 1891.

TO THE EDITOR OF THE RAILROAD GAZETTE:

I now have much pleasure in informing you that 32 of our locomotives, out of a total of 143, are compounded on the two-cylinder, Mallet type, but with many simplifications. The total mileage now run is over one million miles, with compounded locomotives of three types, passenger, 6-wheeled, and 8 wheels coupled, giving a mean economy of 18½ per cent., as compared with the same class of locomotives doing the same work, all burning petroleum refuse. This fact cannot fail to be of interest in the present phase of the compound question in the United States.

THOMAS URQUHART, *M. Inst. C. E. & M. I. M. E.*,
Chief Engineer, Grazi-Tsaritsin Railroad.

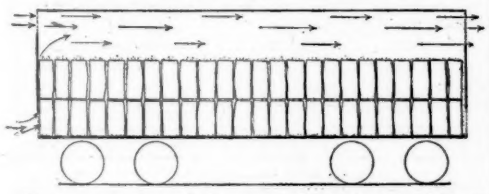
Ventilated Fruit Cars.

PHILADELPHIA, April 18, 1891.

TO THE EDITOR OF THE RAILROAD GAZETTE:

The receipt here lately of several cars of California oranges, which I have noticed, suggests complying with your request to me to give you notes of interesting facts that should come under my observation; and the condition of the inside of these so-called "ventilator fruit cars" on arrivalhere with fruit is very interesting.

The oranges arriving now suffer considerable loss from



The arrows represent the course of the air. The dots represent the dust and dirt settled on the packages.

waste in rot, which is the result, in my estimation, of insufficient ventilation, though these cars are well provided with openings for the entrance and exit of air. Yet this passing of air into and out of the car evidently does not ventilate the load.

These so-called ventilator fruit cars have extensive screened openings in both ends of the cars, the whole width of the car, both at the top and bottom. Undoubtedly the top opening, in the front of the car, will take in quite a current of air, and the bottom may take in a little, but not so much as the top. There is quite a space between the car roof and the fruit packages below. The air that enters the front of the car passes directly through this overhead space and out at the rear end of the car. The air that enters the front of the car, at the bottom, strikes the first packages and rushes up the end of the car to join the current overhead, resulting in no current whatever through the fruit. Practically all the air that enters the front end of these cars flows through the space over the fruit and out the hind end, without any change or motion of air among the fruit. Air, as any other fluid, moves in as nearly a straight line as possible, and being forced in at one end will seek egress at the opening in the opposite end as directly as possible, with comparatively no disturbance of the air among the packages below. The only perfect ventilation in the premises is for the air to be supplied at the bottom underneath the load, and be drawn up through it and discharged at the top, from one end of the car to the other.

That this theory is true is evidenced by the inspection of these cars of California oranges on arrival here, as well as upon the inspection of the Illinois Central cars that arrive here with tomatoes, etc., during their season. The packages in these cars are covered as much as $\frac{1}{10}$ in. deep with dirt, not only on the top tiers, but every projection of the packages below, clear to the floor, is covered uniformly with this dirt, which has dropped from the current of air overhead—the air with the dirt entering at one end of the car, finding its quick way to the space over the load, and thence, along under the roof to the hind end of the car; the air below among the packages being undisturbed, the dirt drops down and settles all among the fruit. If there was any current of air whatever among the fruit, the dirt would not thus settle upon every package, as it is found to do upon arrival here in such "ventilator cars."

DEALER.

American and English Freight Cars.

TO THE EDITOR OF THE RAILROAD-GAZETTE:

My attention has been called to the extraordinary letter of Mr. W. A. Adams, member I. M. E. and I. C. E., published in the columns of your valued journal of Jan. 2, commenting upon a paper which I read before the Institution of Mechanical Engineers in London, in which he says, "I am by no means convinced that the bogie car, on good roads, possesses any advantage whatever over the four-wheeler." It only remains to say that the effect of the vibrations and friction of a four-wheeled wagon can be seen and fully comprehended by taking the king-bolt from a carriage and making the front axle rigidly parallel with the back one, and then try to ride round the corner of a street at any speed. A four-wheeled wagon is a tangent seeker and track murderer, while bogie trucks are track finders and friction preventers.

BARROW-IN-FURNESS. M. R. JEFFERDS.

CHINA, Feb. 2, 1891.

TO THE EDITOR OF THE RAILROAD GAZETTE:

Mr. Jefferds' paper, read before the Institution of Mechanical Engineers, is not likely to receive much credit in America, and it seems surprising that his assertions were not more severely dealt with ("assertions" is too mild a word, but looks better). If not contradicted by the *Railroad Gazette*, I fear that very many extremely hard things will be uttered by engineers all over the world against American car builders, and I for one sincerely hope that you will demolish the mass of rubbish it contains. Nothing could have been better adapted to ruin the prestige of the tube car people in Europe, where railway men are not the idiots Mr. Jefferds imagines, and are well up to best American practise and watch it closely.

C. W. K.

The Right to Buy a Ticket to Any Place.

NEW YORK, April 18, 1891.

TO THE EDITOR OF THE RAILROAD GAZETTE:

In your able editorial on the Chicago & Alton boycott in yesterday's paper, where you so forcibly set forth the truth that the question of conspiracy is one to be decided on prineiples which are firmly grounded in the nature of things, and are above and beyond ancient precedents or even present law, you refer briefly to Commissioner Morrison's dissenting opinion, wherein he holds, practically, that a railroad must sell tickets over all connecting roads that are of decent standing. Your readers will, however, regret that you dismissed this branch of the question with such a brief paragraph. The Alton officials will not admit that the practice of paying commissions "almost necessarily involves the selling roads in violation of the law." They maintain, with considerable show of evidence, that practically no Eastern ticket agent divides commissions with passengers unless the management approves of that kind of practice. I suppose that the evil to be feared from outside and irresponsible scalpers would be met by Messrs. Chappell and Charlton by a proposal to apply some effective remedy of another sort.

Mr. Morrison's reasoning is based on the theory that a road must sell tickets to every station in the United States, and he would, of course, be obliged to fall back on the common law, in addition to the specific terms of the Interstate Commerce Act, if he were to try to maintain his theory seriously. And I must admit that, when there are half a dozen roundabout routes demanding representation, the ticket department would have a complicated problem. Nevertheless, I think that it would be a good thing if you were to illuminate the question a little more fully. If I wish to go to Kansas City via Chicago over the Alton, and my neighbor wishes to go by the same route, but over the Burlington, how can you show that the road, in refusing to him a ticket while giving one to me, is not discriminating between us? Perhaps you will answer that furnishing through cars must be treated on the same basis as selling through tickets, and point out the absurdity of trying to run through cars over a dozen different routes because they are demanded on one or two of the twelve; but, as I have intimated above, a clear statement by you of the pros and cons of this question is what I want to get. If you say that the problem is too complicated for settlement, I shall then argue that the law ought to be amended so as to specifically draw the line between the present status, under which the railroads can do as they please, and the hypothetical condition, under which the public shall have all the facilities they desire. The decision of the Interstate Commerce Commission (which in this case practically amounts to law) has drawn such a line (as between carloads and trainloads) to define the proper limit for the application of the wholesale principle in making freight rates; and there is no reason why the same thing should not be done in other matters.

H. C. K.

[We have discussed this matter at length elsewhere.—EDITOR RAILROAD GAZETTE.]

The Services Rendered by American and English Passenger Trains.

NEW YORK, April 26, 1891.

TO THE EDITOR OF THE RAILROAD GAZETTE:

For a week or so past I have been seeing notices of an article by Prof. Hadley, to the effect that while the charges for passenger service on the railroads of America and England were higher than on the railroads on the continent of Europe, the services rendered by the roads of the two first-named countries were of such a superior character as to justify the extra or additional charge. No one doubts that superior services should be compensated by increased payments, but, as an unobservant traveler, comparing the speeds and comforts of a trip from Liverpool to Dover with those exhibited on the French road between Calais and Paris, I was surprised at the classification, for I should have put the French road very near the English road, but between it and the American road.

Thinking there is a great difference between the comfort of railroad traveling in this country and England, I will, if you please, mention my last experience in both countries.

Having occasion to visit Boston during the past week, I went by a sleeping-car train, and as I always had time to travel by daylight while abroad, there is no comparison to be made with this part of my trip. The return, however, was by a vestibule parlor-car train of four cars, averaging about 60 ft. long each, which were virtually open from end to end, giving a range of some 240 ft., and also offering two separate opportunities for refreshing the inner man, with solids and liquids, and two comfortable, not to say luxurious, smoking compartments. The train was amply provided with lavatories and water-closets for both sexes, which were furnished with such towels and other things as were pertinent. There were two seats in the width of the car, with ample room to turn around without interference with one's neighbors, and a push button, to call the porter, within reach of each chair, and each seat allowed one a comfortable rest for both arms.

The cost of this ride, with gentle persons who respected the rights and comfort of others, with room so ample that until on the platform, leaving the train, no one brushed my shoulder, much less crowded me (leaving out a very fair dinner, certain liquefactions before and after the same, and a quarter to the porter who brushed my clothes and came to my call, was at the rate of a little less than $2\frac{6}{10}$ cents per mile.

About a year ago having to go from Liverpool to London I took a first class passage. Six of us sat on one transverse seat in a car apparently a foot or more narnower than an American car, with an arm rest at each end and one in the middle, common to two persons, so that four out of the six had a rest for one arm each, and two hung up by sticking their elbows in their neighbor's ribs. Those on the seat opposite were in such juxtaposition that when one settled down his knees came in contact with those of the other. And a treaty had to be negotiated before one could straighten out his legs. There were none of the comforts and appliances of civilization; no opportunity to change one's location, and smoking was out of the question. For the matter of food and other refreshment, we had about four minutes at a place called Rugby, where a flaxen-haired houri turned a retroussé nose still more to the grace of God as she served my modest request for two sandwiches and a glass of beer. The beer was good; the sandwiches, however, which were about as thin as the proverbial Poughkeepsie sandwich during the administration of the first Vanderbilt, had remarkable staying powers.

The cost of this ride, as near as I could figure it, was four cents per mile, neglecting the cost of the beer and sandwiches. The rate of speed was a fraction over 43 miles per hour, as against 38.7 miles on the American train. For this additional speed and great discomfort I paid $1\frac{24}{100}$ times as much as here.

Returning to Liverpool with mortal dread of the Rugby sandwich which had downed digestive powers before unimpaired, another route was selected and a third-class ticket purchased. Here, with the additional width gained by dispensing with arm rests, but with no greater width of car, eight passengers were assigned to each transverse seat, a noisome crowd, smelling as if they wore their flannels a month, and not over particular about their dickeys; they were coarse of language and without knowledge of their own rights or appreciation of those of others. For this ride I paid at the rate of two cents per mile. I had come here from Boston in a first-class car, not a parlor car, I should have traveled at the rate 2.15 cents per mile and have had more luxury, room and conveniences than in the English first-class car at four cents.

What does the English traveler get for the higher fare he pays?

C. Y.

The Adhesion of Railroad Spikes and Lag-Screws in Ties.

BY JAMES E. HOWARD.

The report of tests of metals made at the Watertown Arsenal, House Document No. 16, Fiftieth Congress, First Session, contains the results of some tests on the adhesion of railroad spikes and screws driven in ties of hard and soft woods. The spikes were of the ordinary pattern, $\frac{5}{16}$ in. square, with pointed ends. They were driven by an experienced spiker, generally just before testing, or within a few hours of that time, as noted in the details, or in some cases tested in the condition they were in during service in the track. In the latter case, when removing the ties from the track, the spike on one side of the rail was drawn, leaving the other to be experimented upon in an undisturbed condition. There were spikes which were re-driven in the old holes, and spikes driven in bored holes of different diameters. The maximum resistance of each was noted, which, in the case of the spikes, was when drawing first began. With the screws there were instances in which the maximum resistance came later. The observations were continued as the spikes were drawn different distances until the resistance was reduced below the limit of practical value as a railroad spike.

In addition to stating the resistance in total pounds

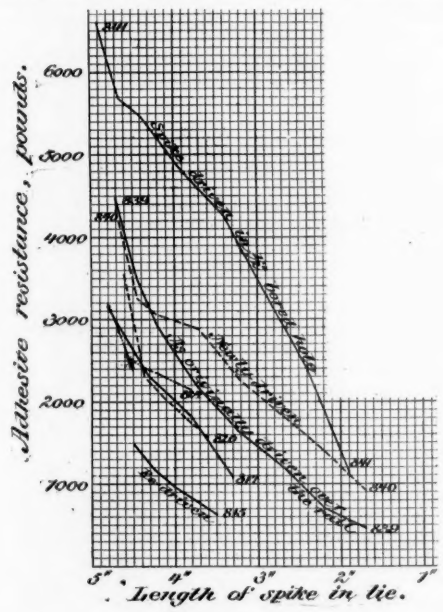


Diagram No. 1.

Chestnut	No. 815, 817, 820, 824
Whit oak	" 839, 840, 841
As originally driven over rail	" 817
Driven 1 hour	" 820
" 4½ *hours*	" 824

the records show the amount of surface of spike in the wood and the resistance in pounds per square inch computed on that surface. The spikes, ranging in length from 5 to 6 in., were driven in the different ties from 4.4 to 5.3 in., one having been driven only 3 in. The total adhesive resistance found was from 1,320 to 6,595 lbs., the former value belonging to a spike in a white cedar tie, the latter to one in white oak. Diagrams Nos. 1 to 4 show some of the results. Diagrams 1 and 2 show the total resistance of 11 spikes driven under different conditions in hard and soft wood ties, and Nos. 3 and 4 the computed resistance per square inch of surface in the wood of the same.

There were 39 tests made at this time, which we will review before discussing the results in a general manner. The government report should be consulted if the complete details are desired.

A chestnut tie was first experimented upon which had been in service sixteen months. Spikes were drawn which had been newly driven and those which had not been disturbed when the tie was taken from the track. The highest resistance was displayed by a spike driven into a new part of the wood to a depth of 4.6 in. one hour before testing. This spike, No. 820, gave a resistance of 3,572 lbs. total, or 413 lbs. per sq. in. of surface in the wood. This resistance somewhat exceeded that of either of the other two spikes, which were tested in the condition they came from the track. Spikes which were re-driven in the old holes showed only about one-half the resistance of the undisturbed ones from the track.

Another chestnut tie was used, one which had been in service four and a half years, and which was abraided and the fibres injured under the rails. Here the highest resistance was displayed by a newly driven spike in a fresh part of the wood; then followed a spike in the condition it came from the track, and next a spike re-driven in an old hole in the order of relative resistance. A spike which was driven in that part of the tie which was under the rail showed resistance intermediate between the last two mentioned. The spike which was tested as originally driven over the rail was characterized by an abrupt loss in resistance shortly after drawing began, at which time the resistance fell from the maximum 2,794 lbs. to 1,700 lbs., the spike drawing about ¼ in. in the meantime.

A yellow pine stick was next used, in which all the spikes were newly driven. The highest resistance obtained was 3,640 lbs., from a spike driven a depth of 5 in. Although this was the highest total resistance found in the yellow pine, yet the resistance per square inch of surface in the wood was exceeded by a spike which was driven to a depth of 4½ in. In the latter case the resistance was 396 lbs. per sq. in. against 381 lbs. in the former. It may be observed in passing that the resistance per

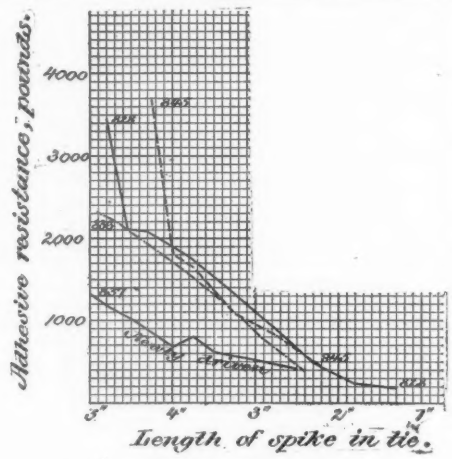


Diagram No. 2.

Yellow pine	No. 828
White cedar	" 836, 837
Hemlock	" 845
Newly driven	" 828, 836
Driven 2 months	" 845

square inch of surface in the wood in the first chestnut tie exceeded that of the yellow pine.

In another yellow pine stick spikes were driven into the solid wood in the usual manner and, also into bored holes of different diameter. As the spikes, which were driven into the solid wood, were not driven so deep as those in the bored holes it will be desirable to compare the relative resistances per square inch of surface instead of the total resistance. When compared in this manner we observe that the spikes in the solid wood gave the highest results, although only slightly above the spike which was driven in the smallest hole. The holes ranged in diameters from ⅜ in. to ½ in.

In an unseasoned white cedar tie a newly driven spike, driven 4.9 ins., gave 2,305 lbs. resistance, while another spike, driven 5 ins., showed only 1,320 lbs. Spikes in ½-in. and ⅜-in. holes gave intermediate results, the spike in the smaller hole giving the more favorable result of the last two.

In a white oak tie, two years and three months old, a newly driven spike gave a result higher than the mean of two tested as originally driven over the rail, although one of the original spikes exceeded the resistance of the

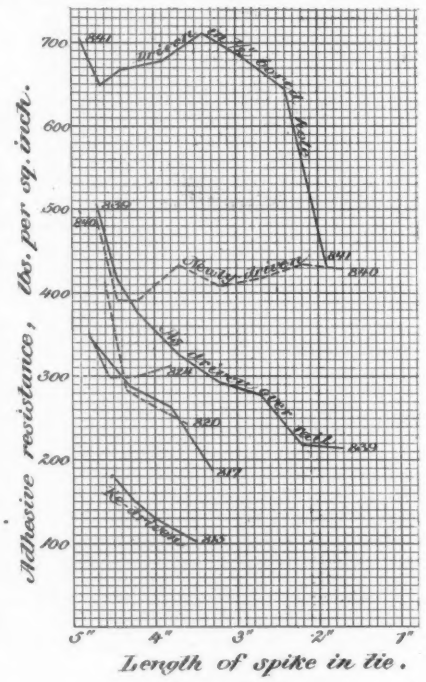


Diagram No. 3.

Chestnut	No. 815, 817, 820, 824
White oak	" 839, 840, 841
As driven over rail	" 817
Driven 1 hour	" 820
" 4½ *hours*	" 824

newly-driven one. The spikes re-driven in old holes displayed less resistance than others. Spike No. 839, as originally driven over the rail, displayed 4,490 lbs. total resistance, or 505 lbs. per sq. in. This high resistance, however, was exceeded by the spikes which were driven into bored holes ½ in. diameter, one of which gave 6,595 lbs. total resistance, or 706 lbs. per sq. in.

In the hemlock tie, the several spikes having been driven different depths the comparison of results will be made according to the resistance per square inch. The highest result, 468 lbs. per sq. in., came from a spike driven into the solid wood. A spike with a blunt point, similarly driven, gave 384 lbs. per sq. in. resistance. Of two spikes driven into bored holes the results were in favor of the spike in the one-half inch hole over that in the three-eighth inch hole, thus differing from the results with the yellow pine and the white cedar in regard to the more effective diameter of hole.

Experiments with the lag-screws showed that a half-inch screw driven into a yellow-pine stick, without any bored hole, gave a maximum resistance of 3,510 lbs. The total length of screw in the wood was 3.8 in., of which length 3 in. was threaded. In this case the screw began to draw at 2,850 lbs., but did not reach the highest resistance until it had been drawn ¼ in. The maximum resistance per sqnare inch was 991 lbs. referred to the cylindrical surface of the threaded portion, not including the pointed end.

In a white cedar tie a ⅝-in. screw, driven into a ½-in. bored hole, displayed a maximum resistance of 2,610 lbs., the screw at the time having been drawn out, 8 in. The resistance per square inch of surface in the wood was 613 lbs. The screw had 2.8 in. of thread in the wood, and was driven a total depth of 3.4 in.

In a hemlock tie a ⅝-in. screw driven into a ½-in. hole gave 4,290 lbs. total, or 796 lbs. per sq. in. resistance. Another test, in which the same sized screw was driven into a ⅝-in. bored hole, the resistance was less than that of the first screw, the total resistance being 3,560 lbs., or

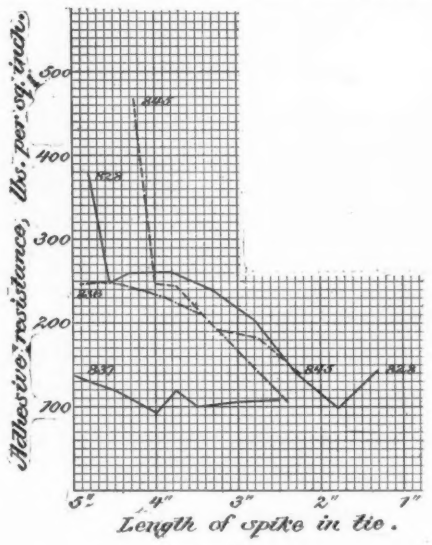


Diagram No. 4.

Yellow pine	No. 828
White cedar	" 836, 837
Hemlock	" 845
Driven 2 months	" 845
All others newly driven.	

673 lbs per sq. in. The screws were driven 3.25 in. and 3.20 in. respectively, the threaded parts being 2.75 in. and 2.70 in. long.

In recapitulation the maximum resistance in pounds per square inch of spikes in the different ties was as follows:

KIND OF TIE.	Resistance per square inch of	
	Spikes.	Lag-screws.
White oak	706	....
Hemlock	468	796
Chestnut	413	....
Yellow pine	396	991
White cedar	247	613

In general these results show the highest resistance was displayed by spikes which were newly driven or those which were tested in the condition they came from the track, not having been disturbed when taken from the road-bed. The loss in resistance was very marked when tests were made with spikes redriven in old holes. It is fair to presume, however, that the spikes described as having been tested as originally driven over the rail had in fact been partially drawn in actual service and driven back to place from time to time as the track was repaired.

Explaining the behavior of a spike somewhat in detail, we observe that a spike possesses adhesive resistance on account of the friction between the sides of the spike and the wood into which it is driven, and this friction depends upon the amount of compressive stress exerted by the wood against the spike, and that the friction will be greater or less according to the character of the surfaces in contact.

In driving a spike the wood is compressed laterally. The resilience or tendency to spring back again gives the pressure against the sides of the spike. The greater the compression of the wood the greater will be the compressive stress until the wood splits; the limit of adhesive resistance is therefore that which is due to a compression of the fibres which splits the wood. Care must be taken, however, in driving the spike that the fibres are not too abruptly displaced.

With spikes of large cross-section dimensions there is

a tendency to carry along some of the fibres in front of the blunt point, and leave cavities next the body of the spike instead of solid wood in close contact.

A comparison of the present results with an earlier series of tests with cut nails, wire nails, common spikes, wood and lag screws shows that the smaller nails and wood screws give relatively the best results. It may be that the large spikes cause excessive displacement and are too destructive to the wood fibres, or the result may follow from the tapering form of the cut nails, or both causes perhaps contribute to the observed facts. The earlier tests referred to, showed cut nails which were barbed had greater efficiency than the plain nails in white pine wood, but displayed the opposite results when driven into harder wood.

From the evidence now before us it would seem that, were it required to materially increase the total resistance of a spike, we should experiment in the direction of larger spikes and with bored holes to receive them, and while the adhesion per sq. in. of surface might not reach so high values as in the case of small nails, yet the large increase of surface in the wood might adequately compensate for any difference in resistance per sq. in. of surface. Of course, there is a limit to the size of a spike, beyond which it would be impracticable to go on account of the injury which it would do the wood, unless resource is had to bored holes.

Concerning the adhesion of a newly-driven spike in comparison with one which had been some time in the wood, there are opposite tendencies, those which tend to diminish and those which tend to increase the adhesion for a time after driving. Tests of wood under endwise compression have shown that a slow yielding goes on for a time after the immediate effect of a high load has been felt, which kind of action would relieve the intensity of pressure against the sides of the spike, and with the release of pressure would occur a corresponding loss in adhesive resistance. A spike repeatedly driven and withdrawn from the same hole would cause abrasion of the wood fibres and enlargement of the hole. On the other hand, the acquisition of a slightly rusty surface might largely increase the adhesion, if we may judge from the behavior of wire nails tested with bright and with slightly rusty surfaces. Changes in the condition of the wood as regards sap or resin in certain kinds of wood, or the amount of moisture present, might bring about increased resistance by increasing the frictional resistance of the surfaces. In driving it is, of course, important that the hammer-blows should fall fairly upon the spike, as oblique blows would enlarge the hole, cause excessive compression on one side, and draw the spike away from the wood on the other side. The wood on all four sides of the spike should be in good condition after driving, excepting such destruction to the fibres as may be unavoidable in making place for the entrance of the spike.

In drawing the spikes with the testing machine care was taken that the line of pull was in the axis of the spike, avoiding an oblique pull. Whether a spike will hold better against a direct or an oblique pull will depend in a measure upon the stiffness of the spike against transverse bending. Cut-nails driven obliquely gave inferior results. They bent easily in drawing, the fibres of the wood on the inside of the bend, were injured by excessive strains, while those on the outside lost their efficiency because the nail was drawn away from them. To increase the resistance with obliquely driven nails or spikes requires an increase in the ordinary transverse strength, so the wood itself shall bodily oppose the withdrawal of the spike instead of the latter bending. In this case it is the shearing strength or tensile strength across the grain, instead of the adhesive resistance proper that is depended upon to hold the spike. Limiting our statement to examples of direct and simple adhesion, the evidence now at command shows the greatest resistance is commonly obtained by a direct pull on the spike.

Evidence furnished by the earlier series of nail tests showed that the fibres which acted in a sidewise direction against the nails were more efficient than the endwise grain. This was shown by driving the nails with the tapering surfaces against the grain in a crosswise direction instead of parallel to the grain after the usual manner of driving, thereby increasing their efficiency. The present series of tests was made with well-seasoned and dry ties. It is intended to present at an early date some further results obtained with spikes in wet and oily wood and bolts driven in holes of different diameters causing the wood different amounts of compression.

The holding power of lag-screws depends upon the strength of the wood against splitting or the tensile strength across the grain.

Their action is similar to obliquely driven spikes when the latter possess adequate transverse strength to resist bending, excepting the thread on the screws enable them to take a firm hold of the wood on all sides and over a large surface in consequence. These are conditions favorable for securing high ultimate resistance, hence we find the holding power of screws greatly exceeds that of nails.

Notwithstanding the diminished resistance which occurs during the withdrawal of the spikes the fact will be duly recognized that considerable mechanical work is required to be done before the spike is finally useless for its intended purpose. This in one way serves to emphasize the difference which naturally pertains to the use of wooden and metallic ties according to the lines of present proposed methods although, the change in conditions when passing from a yielding to a more rigid support might materially change the requirements of a spike or the means employed to secure the rail in place.

WATERTOWN ARSENAL, MASS., April 6, 191.

Some Recent Baldwin Compound Engines.

The four-cylinder compound locomotive designed by Mr. Vauclain, of the Baldwin Locomotive Works, was carefully described in the columns of the *Railroad Gazette*, May 2, 1890, and was much discussed in later issues, and Mr. Barrus' report of its performance on the Baltimore & Ohio Railroad was published at considerable length in our issue of Sept. 12, 1890.

Within the last few months a considerable number of these engines has been turned out or put under construction. The orders include engines for South America and New South Wales, as well as for the United States. The illustrations herewith show two of these engines—a standard-gauge mogul for the Northern Pacific, and a narrow-gauge consolidation for the Bahia Extension, Brazil. The principal dimensions of these engines are given below. Both are intended to burn soft coal. Particulars of the two engines not given in the table of dimensions are as follows: Both engines have steel boilers. In the case of the Northern Pacific the boiler-plates are ½-in. and $\frac{3}{16}$-in. thick, with wagon top. The tubes are of kalamine iron. The engine is provided with the Nathan sight feed lubricator; has the Laird guide; crossheads of cast steel; piston rods and valve stems provided with Jerome packing. The valves are balanced; the driving tires are of Krupp crucible steel, 3 in. thick; the front and back drivers are flanged, and have treads 5½ in. wide; the main drivers are plain and have treads 6½ in. wide; feedwater is supplied by Friedman injectors. The engine was equipped with the Boyer speed recorder and Westinghouse-American driver brake. The tank has a capacity of 3,500 gallons, has an oak frame and 33-in. chilled wheels.

The Brazilian engine is for meter gauge. The boiler is straight; plates $\frac{7}{16}$ in. thick. The driving tires are of cast steel 2½ in thick; the front and back pairs flanged, 5 ins. wide on tread; the middle pair plain, 6 in. wide. Feedwater is supplied by a pump and the Korting injector. The engine is equipped with the Westinghouse-American driver brake, and also with the Le Chatelier brake apparatus. The tank has a capacity of 1,600 gallons. It has a channel-iron frame, centre-bearing trucks, with 26-in. wheels. It will be noticed that in this engine the high-pressure cylinder is placed underneath the low-pressure on account of the small driving wheels.

This engine is designed to run on a road with curves of 150 meters radius. The distance between rails of adjoining tracks is two meters.

General Dimensions.

	Northern Pacific.	Bahia.
Cylinders: Low pressure, diameter..	19 in.	15 in.
High " " ..	11 in.	9 in.
Stroke " ..	24 in.	18 in.
Driving wheels: Diameter outside...	56 in.	37 in.
" centres....	50 in.	32 in.
Driving axle journals.....	7½ × 8½ in.	5½ in. and 6 × 7 in.
Total wheel base.....	27 ft. 3 in.	18 ft. 2 in.
Driving wheel base.....	15 ft. 3 in.	11 ft. 4½ in.
Gauge.....	4 ft. 8½ in.	1 metre
Weight in working order:	Northern Pacific.	Bahia.
" Total.....	106,000 lbs.	62,000 lbs.
" on drivers.....	90,000 "	53,000 "
Boiler diameter.....	56 in.	48 in.
Tubes: Number.....	233	126
Diameter.....	2 in.	2 in.
Length.....	11 ft. 7½ in.	10 ft. 1½ in.
Fire-box: Length.....	71½ in.	79⅞ in.
Width inside.....	34⅜ in.	27⅞ in.
Side and back sheets.....	⅜ in.	⅜ in.
Crown sheet.....	⅜ in.	⅜ in.
Flue Sheet.....	½ in.	½ in.
Heating surface: Tubes.....	1,458 sq. ft.	
Firebox.....	123 "	
Total.....	1,581 "	
Grate area.....	15.5	
Truck wheels diameter.....	30 in.	24 in.
" axle journals.....	5 × 8½ in.	3½ × 6 in.

Coke as an Engine Fuel on the Baltimore & Ohio.

BY T. H. SYMINGTON, *Inspector.*

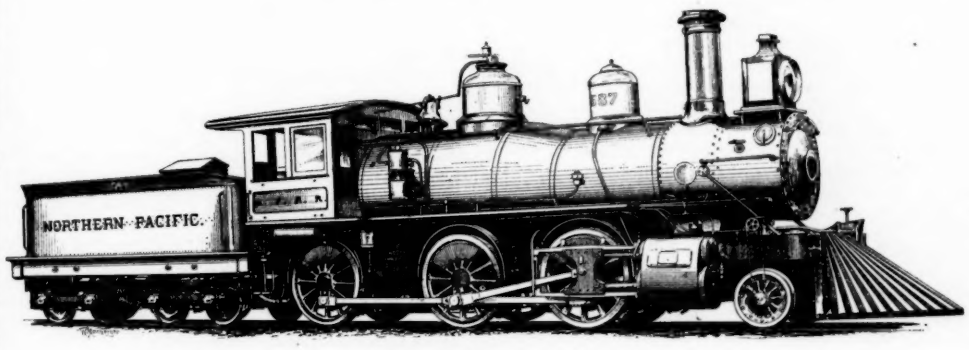
The first steps in any departure from custom in the machinery department of a railroad are generally accompanied by dissatisfaction among the employés, and complaints of the inefficiency of the change. In a great measure the trouble is due to the well-known dislike of both enginemen and firemen for anything new, and also to their fear of incurring conditions that may detract from the efficiency of their engines.

Some time ago the Baltimore & Ohio management decided, as an inducement to passenger traffic on its Philadelphia Division, to do away with the smoke and dirt which are always attendant on soft-coal burning. To do this it was decided to burn coke, which, though a troublesome fuel, is entirely free from the objectionable smoke.

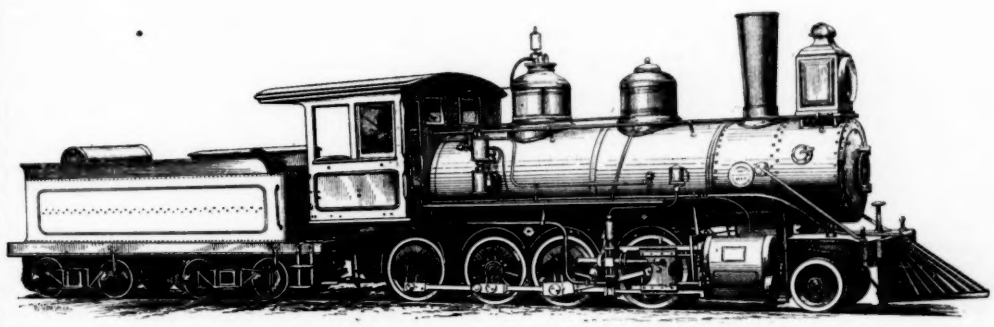
After numerous experiments and failures, notwithstanding the strong prejudice of the men against its use, the Motive Power Department now feels confident that certain classes of engines can burn coke successfully under all conditions of service, and under the most adverse circumstances.

At first it was thought that a variable nozzle was absolutely necessary on these coke-burning engines, but after trial, those equipped with plain nozzles were found to work equally as well, if not better, and, in most cases, the variable nozzles were removed. On several engines three 2¼-inch thimbles were inserted through the rear end of the boiler so as to admit air above the fire; but these also were found to be unnecessary, and thereafter, no changes were made, with the exception of the removal of the brick arch when an engine was changed from a coal burner to a coke burner.

In construction, it was found that the best engines for coke burning were those with large grate area, and with the ordinary extension front. No trouble was experienced from filling up the extension with sparks, as comparatively few particles of coke pass through the tubes, and these are thrown from the stack, though not in a state of combustion so as to injure property by fire. The netting should be as large-meshed as possible, for it often gives trouble by gumming over, thus cutting off the draft, and preventing the free steaming of the engine. The diaphragm should be arranged as in coal burners, so as to burn the fire evenly from tube sheet to door. Of course the nozzles should be as large as possible, and generally no change was found necessary when changing from coal to coke. The best grate arrangement is one that gives an abundance of air, for the coke



For the Northern Pacific.



For the Bahia Extension, Brazil.

COMPOUND LOCOMOTIVES BY THE BALDWIN WORKS.

being fixed carbon, requires very little, if any, air above the fire for its perfect combustion; and, should the grates be too close, the gas evolved, instead of being carbonic acid, escapes through the stack as carbonic oxide.

This gas, from its readily combustible nature, wastes an enormous amount of heat, and is intensely disagreeable to the lungs.

It is absolutely necessary that the coke should be as free from sulphur and dirt as possible, and there should be no soft, black end caused by the coke being indifferently burnt; nor should it be broken up finely, for, being very light, it is in this condition drawn up against the tube sheet by the draft, and frequently covers the tubes over entirely. The sulphur not only collects over the grates shutting off the air, and burning out the bars, but helps to form the clinker that covers the tube sheet, which is very troublesome to remove, and seriously affects the engine's steaming. The harder the coke is burnt the better does it work as a locomotive fuel, for hard coke is heavy and has more body than that which is only burnt a short while; it is also less liable to be crushed in handling and in transportation. The best coke for the purpose is of bright, glistening, silver-grey color; it is heavy, and comes in stringy pieces about the size of a husk of corn.

One serious disadvantage from the difficulty of getting pure coke is that the fire has to be drawn at the terminus of every long run, the tubes cleaned out, and the gummy deposit brushed from the netting in the front end. It is a good plan to brush the tubes out after punching them, though this entails a little more time and trouble.

The only extra tools the fireman needs are a scraper with which to clean the tube sheet when clinkered over, and a No. 6 shovel; the ordinary coal shovel being too small to handle coke quickly and effectively, owing to the bulkiness and comparatively light weight of the fuel.

Before leaving the roundhouse the fire should be well under way, and it usually takes about an hour to get it into such shape as to insure steam on a hard run. Should it be necessary to run an engine out before the coke is thoroughly burnt through, it is with the utmost difficulty that any steam at all can be obtained on the run.

Contrary to the original ideas of the men, there is no mystery about the fireman's duties in burning coke successfully, for any good coal fireman soon learns the few essential points, and after learning the method generally prefers the coke to coal. The best firemen carry medium-sized, level fires, and, by constant attention and frequent light shaking of the grate bars, keep their steam pressure uniform, and prevent the objectionable carbonic oxide gas. Owing to the difficulty of keeping the fire up, however, most firemen prefer not to run the risk of letting their fires get away from them, so carry heavy fires, high near the door and sloping to about 12 in. on the drop-gate. By wetting the coke the sharp, cutting dust is prevented from annoying the men on the engine.

The addition of some coal to the coke makes a splendid steaming combination, though the amount of smoke is exactly proportional to the percentage of coal used. It is probably a good plan to start by giving the men a small amount of coal, as it lessens the chances for serious failures, and the coal supply can be reduced or cut off entirely at the discretion of the master mechanic. The coal in a great measure prevents the clinkering over of the tube sheet, and it is quite difficult to keep the men from getting too much at the chutes.

Enginemen have to co-operate with the firemen as far as possible, for, as they say, coke is uncertain stuff, and every advantage has to be taken of it.

Owing to its bulk, the tenders have to be loaded rather high, but this is perfectly feasible when boards are placed on each side of the tender, raising it about 10 or 12 inches.

At present all passenger engines are burning coke on the Philadelphia Division of the B. & O. where the road is desirous of having clean trains, from small engines on local runs to those on limited trains running between Philadelphia and Washington.

APRIL 21, 1891.

The Railroad Rates Question in England.

Thursday, April 9, will mark an epoch in the history of English railways. On that day meets a Joint Select Committee of both Houses of Parliament, which will, it is hoped, bring to a final settlement, at least as far as the companies having termini in London are concerned, the long-vexed question of the revision of goods rates. American readers accustomed to the rapid development of railway history in their own country will smile to hear that the first act of the drama, whose last act is to begin to-morrow, dates back to precisely 10 years ago. In the year 1881 a Select Committee of the House of Commons took evidence at enormous length on the question of rates and fares. The session came to an end before it had time to make a report, so in 1882 the committee was re-appointed, and, after taking more evidence, and a long and fierce conflict between the two parties on the committee itself, it finally put out an elaborate report. The committee had had before it two questions to decide; the first, whether the railway companies were making illegal charges—for it will be remembered that English companies have maximum rates fixed for them by act of Parliament; the second, whether their charges, even if legal, could be practically justified under existing conditions. The most important passage in the report was the following:

"Your committee report that, on the whole of the evidence, they acquit the railway companies of any grave dereliction of their duty to the public. It is remarkable that no witnesses have appeared to complain of 'preferences' given to individuals by railway companies as acts of private favor or partiality, such as were more or less frequent during the years immediately preceding the act of 1854."

But the practical recommendation of the committee, with which we have here to do, was that the powers of the companies to charge their rates, which at present have to be sought in a wilderness of 3,000 different acts of Parliament, spread over a period of 65 years, should be revised, and one simple, intelligible scale for each company substituted for the chaos of its 80 or 100 special acts.

The railway companies, being thus invited by Parliament to "consolidate their existing acts," promoted bills for the purpose in the session of 1884, but, when the shippers came to see, set out in black and white, in an intelligible form the enormous powers of charging which the railway companies possessed, they sent up from all quarters of the country such howls of dismay and indignation that the railway companies bent their heads to the storm and withdrew their bills. The companies pointed out—they have gone on pointing it out ever since—that a right to charge a shilling on traffic which would cease to go entirely if any rate higher than five pence was charged, was not the same thing as a desire to charge it. The traders refused to believe them. If the company had no idea of charging more than five pence, why did it claim its right to a shilling because that right had been conceded 50 years before? No practical railway man needs to be told the answer, so let us here get on with the history.

The companies having failed, the government, Mr. Gladstone's, took the matter up. They brought in bills, but failed to pass them. Then the Conservative government came into office, and, after another unsuccessful attempt in the year 1888, the Railway and Canal Traffic Act was finally passed. Section 24 of that act provided that every railway company should submit to the Board of Trade—the English Ministry of Commerce—"a revised classification of merchandise traffic, and a revised schedule of maximum rates and charges applicable thereto proposed to be charged by said railway company." The section then went on to specify at great length the further procedure to be adopted in the settlement of the schedules. Here, however, it will be better to follow the question as a matter of historical narrative.

The railway companies duly submitted their classification and their schedules of rates. Once more, however, they attempted to preserve their existing powers; again there was a fierce outcry of those who at least claimed to speak on behalf of the trading interests of the country. Within a few weeks 1,100 different objectors lodged their protests with the Board of Trade. The Board thereupon appointed two of their own officials, Lord Balfour of Burleigh, the Parliamentary Secretary to the Board, and Mr. Courtenay Boyle, the permanent head of its railway department, to form a tribunal, before whom the railways and their opponents could each state their case. The first sitting of the tribunal was in October, 1889, and the hearing was prolonged till July, 1890, when the report of the officials was at length published and laid before Parliament.

More difficult task than that allotted to Lord Balfour and Mr. Boyle was surely never laid on the shoulders of two frail mortals since the world began. To fix actual rates is a difficult task enough, as those who have followed the decisions of the English Railway Commission or the American Interstate Commerce Commission can testify. But to fix maximum rates is a task which, from its very vagueness, is tenfold more difficult. Parliament had deliberately declined to afford any guidance as to the principle to be adopted. As the Railway and Canal Traffic Act, under which the Board of Trade was acting, left the House of Lords, the Board of Trade was instructed to "determine the schedule of maximum rates and charges which *it* would, in the opinion of the Board of Trade, be just and reasonable *to substitute for the existing maximum rates and charges of the railway company, as upon the whole equivalent to such maximum rates and charges.*" The House of Commons, however, struck out the words in italics, and left the Board of Trade to act at its own unfettered discretion. Unfortunately, the Board of Trade tribunal could hope for but scant assistance from the litigants who appeared before them. On the one hand, the railway companies steadily persisted that they had a right to that which Parliament had—rightly or wrongly is here, of course, beside the question—deliberately refused to give them, viz., a schedule of rates on the whole equivalent to their existing powers. On the other hand, the traders shouted louder and louder that they had a right to use the process of fixing maxima as a means of reducing existing charges. So loud, in fact, did they shout that before the end of the inquiry they had evidently, by force of noise and numbers, well nigh convinced themselves of the justice of their own case.

Then the faddists swooped down in flocks. There was the equal-mileage crank, the cost-of-carriage crank, and all the other different varieties of that widespread genus. One gentleman wanted a brand-new classification with 40 classes, another favored the German system of no classification at all to speak of. Last, but not least, there was a gentleman interested in the "construction of wagons on the American principle," who assured the tribunal that, if the English companies would only carry their goods in tubular frame cars, they would be able to economise 65 per cent.—not of locomotive cost merely, but of the total expenses of maintaining the transportation service both for goods and passengers over the entire road.

Through all the din and through all the weary months that the inquiry lasted, Lord Balfour and Mr. Courtenay Boyle kept both their heads and their tempers. When at length their report appeared, it was found that they had drawn the line of the new maxima with remarkable skill just above the tops of the existing charges. Margins for possible increase in the future—in the case of local traffic in small quantities at least—had wellnigh disappeared, but, closely as the line had been drawn, it had only cut off some £300,000 out of an income of something like £30,000,000 derived from goods.

At this point came in once more the question of principle. The report of Lord Balfour and Mr. Courtenay Boyle was only a preliminary proceeding. The President of the Board of Trade had three courses open to him. He might have accepted the report as it stood; he might have said: "Parliament has intrusted to us the revision of statutory maxima. It is no business of ours to pass upon the justice of actual charges; for that purpose Parliament has provided suitable judicial machinery. We are bound to fix the new maxima at a point high enough to cover existing charges against which there is no complaint." Or, again, he might have taken upon himself to revise the schedules once more, on the ground that in his opinion it was just and reasonable that a still larger proportion of the property of the railways should be handed over to the traders. Cynics, in fact, have summed up the situation by saying that on the eve of a general election a Conservative Minister was bound to demonstrate that Codlin, and not Short, was the traders friend.

The third of the three possible courses has certainly been the one adopted by the President of the Board of Trade. The schedules as drafted by Lord Balfour and Mr. Courtenay Boyle have been altered so that the loss inflicted upon railway shareholders is now estimated at something like £600,000 per annum, instead of £300,000. Even the Board of Trade's decision, however, is not yet final. The schedules drawn up by the board have to be confirmed by an act of Parliament before they obtain the force of law. Bills for this purpose have already been read a second time in the House of Commons; they now stand referred to a joint committee consisting of five peers and five members of the House of Commons; and it is with this committee, which, as has been said, meets for the first time on April 9, that the final decision of the matter will practically rest. What line they may take, no one can of course say. Even the procedure to be adopted is by no means clear. As far as can be understood, the Board of Trade will lay its proposals on the table of the committee, and there leave them. Objectors—and the railway companies on the one side, and the traders' associations on the other are fully prepared to take up this position—will then appear with counsel and witnesses and invite the committee to modify the Board of Trade's schedules in the one direction or the other.

Two facts, perhaps, are obvious even now—the one, that both sides are getting tired of the wrangle; the other, that if the committee attempts to hear the whole case *de novo* the question cannot possibly be settled this session. Being a committee of practical Englishmen of mature years, it will, we may safely guess, make no attempt to reach a logical standpoint, and will be contented if, by some rough and ready compromise, it can do something like substantial justice to the railway interests. In all probability before the session ends Parliament will have abridged in not inconsiderable degree the existing revenues of the railway companies. Private property will, in the words of the United States Constitution, "have been taken for public use," not only without just compensation, but without any compensation whatever. But England is a strange country, and no one except those immediately concerned will take any notice of what a foreigner might naturally regard as a revolutionary precedent; and English railway companies will continue to be able to borrow all the money they need at only a fraction over three per cent.

LONDON, April 8, 1891.

Hawksworth's Fire-Box Doors.

The outside fire-box door which we illustrate was designed some time since by Mr. D. Hawksworth, Superintendent Motive Power Burlington & Missouri River in Nebraska, and has been used on a number of engines on the line, and is also being tried on the Chicago, Burlington & Quincy. The mechanism is very simple, and easily applied to the regular door, the old-style latch and chain being left on (the latch blocked up), so that should anything work out of order, the fireman by pulling out the plug under the latch may use the door in the ordinary manner.

The door is operated entirely by the fireman with his foot. After filling his scoop with coal he presses down with his left foot the button *A*, which comes up through

a ferrule in the deck, and projects about ⅛ in. above the surface. The depression of the thimble *A* opens the valve and allows the air from the reservoir to enter at *B*, pass around the valve stem and out at *C*, which is connected by pipe to *D*, thus forcing the piston out, which, by means of the rack and pinion, swings open the door. The door remains open until the fireman raises his foot from the thimble when the air exhausts through the lower end of the foot valve, and the door is shut by the spring in the cylinder behind the piston. The draft on the fire holds the door closed tightly.

The pin on which the door swings is turned except where passing through the hinges of the door, at which points it is squared. There is a keyway cut for the pinion.

The cylinder has a 2¼-in. bore for part of its length, being cored 2⅛ in. for about 4½ in. at the back end. It is fitted for a small gland for waste packing at this end, and is closed with a tapped plug at the opposite end. The rack is connected to the piston rod by a pin, and slides in the sleeve at *E*. The cylinder and pinion are fastened to the boiler head just above the door with studs, as shown, which, as they are small, will not project sufficiently to be in danger of getting knocked off.

The inside fire-box door is an improvement over the outside door in the matter of economy of time that the door is open. The door is swung in from a hinge fastened to the boiler head above the centre of the door hole by means of the small oscilating cylinder which works the bell crank *G*. This cylinder takes air at each end from a ¼-in. pipe running to the valve under the deck. It will be noticed that this valve differs from the one used with the outside door; in that it is double. When the thimble in the deck is depressed, the air passes from the reservoir to the top of the cylinder and opens the door, as with the outside door, but when the foot is removed the air escapes from above the piston and there is direct connection between the reservoir and the lower end of the cylinder through the $\frac{3}{64}$-in. hole drilled in the check valve. Although the door would close itself by gravity the heavy draft on the fire would open it again, and thus it becomes necessary to hold it closed with air pressure in the cylinder.

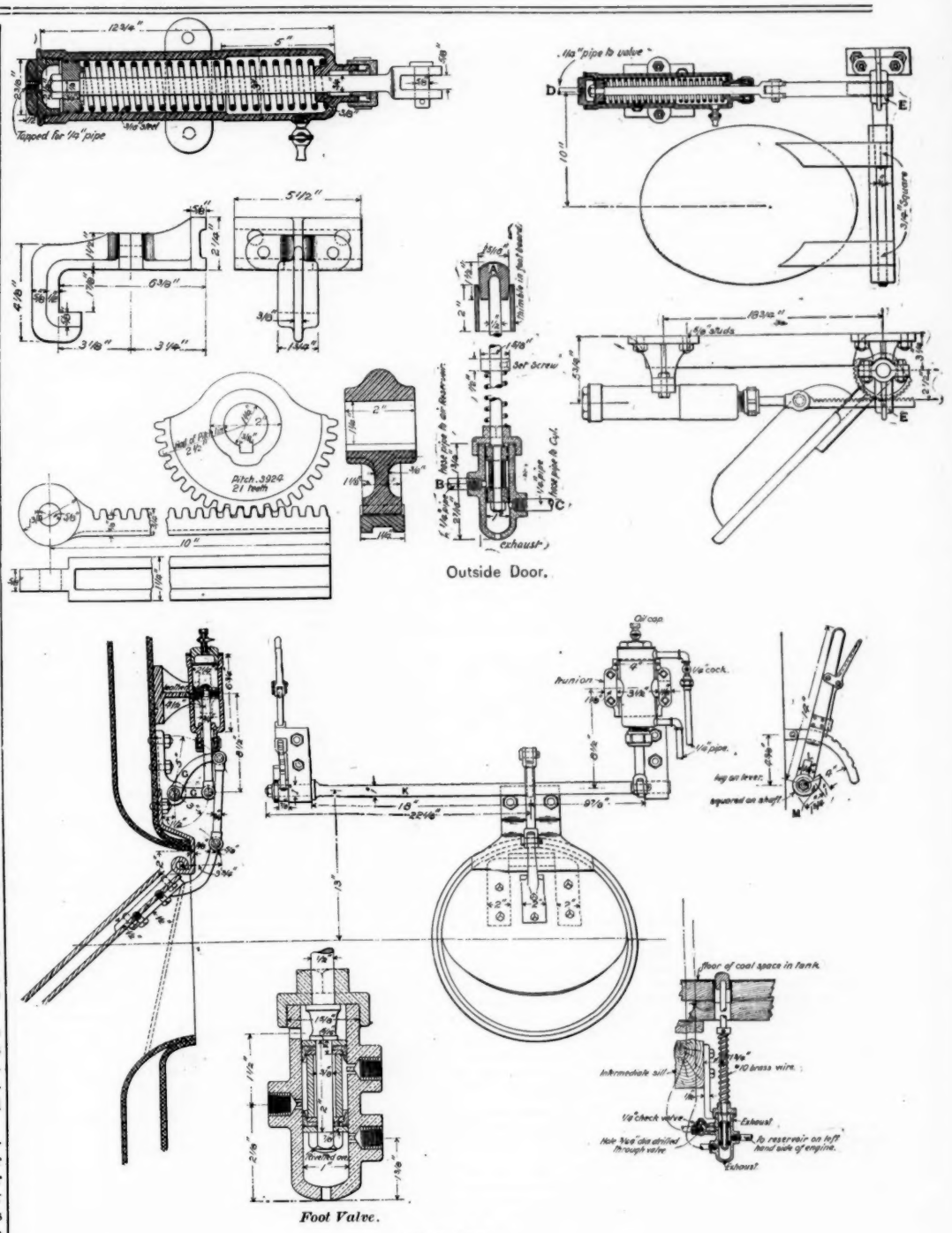
In order to allow the fireman to open the door by hand there is provided a small latch lever at the left, on the end of the rod *K*. This lever has a lug *L*, which pushes against the cam *M*, and enables the door to be set open any amount.

A change, not shown in the sketch, which it has been thought best to make is, the riveting on of a strip of iron to the sheet where the lower part of the door strikes, to take the wear which would result in time from the constant shutting of the door.

Both of these devices are compact and of moderate cost, and from the saving in the length of time that this door is open as compared with the ordinary hand-chain door, there is sufficient reason for its careful examination by those interested in making every point tell toward economy of fuel in the fire-box.

When these doors are first put on an engine, the fireman for two or three days will involuntarily reach for the chain a good many times during the run, so that for several days the doors are not much in favor, but after becoming accustomed to using his foot instead of his hand, and finding that he saves twice reaching for the chain, once before and once after each shovel of coal he pitches through the door, the fireman readily succumbs to the fitness of things, and thereafter is a firm advocate of this labor-saving device.

The length of time saved with this door in which the cold outside air is rushing into the fire-box is the amount of time it takes the fireman to reach from the chain to the scoop, and the lifting of the scoop, plus the time taken to unlatch the door when closing it. Although this is not very long, still, if multiplied by the number of scoopfuls in five tons of coal, it will be acknowledged that the loss from the unnecessary deadening of the fire in the course of a run is very considerable; and the money value of some device for making this saving in the coal pile is proportionately great. It is just this attention to details which accomplishes so-called phenomenal results, and progressive railroad men are constantly watching for improvements of such a character, which, on account of the great multiplication of the number of small savings produce a decided economy in the operating expenses.



HAWKSWORTH'S FIREBOX DOOR OPENER.

Train Accidents in the United States in March.

COLLISIONS.

REAR.

1st, on Wabash road, near Carbon, Ia., a freight train ran into the rear of another freight, wrecking a number of cars, killing 2 passengers in the caboose and injuring 3 trainmen.

4th, on New York Central & Hudson River, at Palmyra, N. Y., a freight train ran into the rear of another freight, wrecking the caboose and killing the conductor.

7th, on Buffalo, Rochester & Pittsburgh, at Hutchins, Pa., a freight train ran into the rear of a preceding freight, wrecking an engine and several cars and injuring a brakeman. There was a dense fog at the time.

7th, on Pennsylvania, at Moyer Station, Pa., a passenger train ran into the rear of a wrecking train, smashing the rear car and badly damaging the engine. Fireman, baggageman and one passenger injured.

7th, on Illinois Central, near Hickory Valley, Tenn., a freight train ran into the rear of another freight, derailing and damaging the colliding engine and smashing the caboose. Two trainmen injured.

8th, on Burlington & Missouri River, near Mascot, Neb., the rear portion of a freight train which had been divided to facilitate manipulation down a steep grade, got beyond control and crashed into the forward portion with great force, doing considerable damage. The engineer was thrown out of the cab window and killed.

14th, on Flint & Pere Marquette, at Brick Run Station, Mich., a passenger train was run into at the rear by a freight train, badly damaging the rear sleeper and injuring several passengers, one of them seriously.

13th, on New York, Chicago & St. Louis, at South Whitley, Ind., a local freight train was run into at the rear by another freight, disabling the engine and wrecking the caboose and 5 cars. Three passengers in the caboose were badly injured.

20th, 4 a. m., on Boston & Albany, near Becket, Mass., a westbound freight train ascending a steep grade, with both a pulling engine and a pushing engine, broke in two; the forward portion was stopped at Becket station, and the runner of the rear engine, being ignorant of the breakage, kept on and ran into the other, derailing 9 cars, and making a bad wreck which blocked both tracks.

20th, on Fitchburg road, near West Ashburnham, Mass., a freight train broken in two and the detached portions afterwards collided, wrecking 8 cars and injuring 2 brakemen.

23d, on Pittsburgh, Cincinnati, Chicago & St. Louis, at Conesville, O., a passenger train moving rapidly ran into the rear of a freight train going into a side track. The engine was overturned and badly damaged, injuring the engineer and fireman.

23d, on Toledo, Ann Arbor & North Michigan, at Shepard, Mich., a freight train was run into at the rear by an empty engine, which, together with the caboose and 6 cars was wrecked. One trainman injured.

24th, on Chicago & Eastern Illinois, at Naston Creek, Ind., a freight train ran into the rear of another freight, making a bad wreck, and injuring several trainmen.

24th, on New York, Lake Erie & Western, near Whitehouse, N. Y., a freight train ran into the rear of another freight, wrecking engine and 17 cars. Engineer hurt.

25th, on Burlington & Missouri River, near Sutton, Neb., a passenger train with two engines, and pushing a snow plow, moving at 40 miles an hour, ran into the rear of a freight going about 20 miles an hour, wrecking the caboose and a stock car, and derailing and overturning the rear engine of the passenger train, killing the engineer and fireman. There was a heavy snow storm at the time.

26th, on Chesapeake & Ohio, in a tunnel, near Fort Spring, W. Va., a passenger train ran into the rear of a freight train which occupied the track on the passenger train's time without protection. The caboose was wrecked and fired by an overturned stove and, together with all the cars of the passenger train, was burned up. Two trainmen slightly injured. The damage to the tunnel was slight, there being but little timber work in it.

27th, on Fall Brook Coal Co.'s road, at Dresden, N. Y., a freight train ran over a misplaced switch and into some freight cars standing on a siding, doing some damage. One trainman slightly injured.

29th, on East Tennessee, Virginia & Georgia, near Eleanor, Ala., a passenger train ran over a switch which had been maliciously misplaced and into a car loaded with lumber standing on a siding, damaging the engine and injuring 2 trainmen, one of them fatally.

30th, on New York, Lake Erie & Western, at Wadsworth, O., a mixed train entering a siding was run into at the rear by a freight entering the yard at too great speed, disabling the engine, wrecking the rear coach and slightly injuring 3 passengers.

31st, on Kentucky Central, near Cynthiana, Ky., a freight train broke in two and the two portions collided, wrecking several cars, including the caboose, and killing the conductor.

And 23 others, on 16 roads, involving 5 passenger and 35 freight trains.

BUTTING.

1st, on Union Pacific, near Alto, Wash., butting collision between passenger trains, due to a confusion of orders, wrecking the forward portion of both trains. Three trainmen injured. A mail car was set afire by an overtuned stove and partially consumed.

6th, on East Tennessee, Virginia & Georgia, near Tyner's, Tenn., butting collision between two freight trains, wrecking both engines and injuring 2 trainmen.

8th, on Louisville, New Orleans & Texas Pacific, near Ensley, Ala., butting collision between two freight trains on a curve, wrecking both engines and 15 cars. Brakeman, engineer and 5 tramps injured. The trains were to have met at Ensley, but the engineer of one of them, whose watch was wrong, leading him to suppose that there was time to meet the other train at the next sta-

tion, pulled out of Ensley "before the conductor could check the error."

15th, on Lake Shore & Michigan Southern, near Goshen, Ind., butting collision between two freight trains in which both engines and 20 cars were wrecked and a fireman killed.

18th, on Chicago, Rock Island & Pacific, near Fairburn, Neb., butting collision between a passenger and a freight train, damaging both engines and a freight car, and severely injuring an engineer.

24th, on Chicago & Northwestern, at Racine, Wis., butting collision between a passenger train and a freight train of 64 cars which entered the yard at too great speed. Both engines and the mail, baggage and 5 freight cars were wrecked. Fire broke out and the freight cars and two baggage cars were burned up. The sleeping car took fire, but the flames were soon extinguished. One trainman killed and 4 seriously injured.

25th, on Chesapeake & Ohio, near Rock Castle, Va., butting collision between 2 freights, wrecking both engines and 15 cars, killing both firemen, and injuring a conductor and a brakeman.

27th, on Atchison, Topeka & Santa Fé, near Las Vegas, N. M., butting collision between freight trains, due to one of them running in violation of orders. The forward portions of both trains were wrecked, killing a fireman and injuring 4 other trainmen.

27th, on Delaware & Hudson, near Wells Bridge, N. Y., butting collision between a passenger train and a freight, due to failure of the former to sidetrack according to orders. Both engines were badly damaged, and several freight cars were wrecked, took fire and were burned up. One trainman killed and 3 injured.

And 9 others on 9 roads, involving two passenger and 16 freight trains.

CROSSING.

4th, on Philadelphia & Reading, near Cressona, Pa., a locomotive ran into the side of a passenger train at a junction of a branch line, badly damaging the baggage and smoking cars. Two passengers injured.

13th, on Columbus, Shawnee & Hocking Valley, at Shawnee, O., an engine returning from a coaling trestle became unmanageable, and rushed into a roundhouse, damaging three engines.

23d, on East Tennessee, Virginia & Georgia, near Atlanta, Ga., collision between two switching engines, killing a yardman.

25th, on Southern Pacific, at Ashland, Ore, some cars of a switching freight ran uncontrolled into a caboose standing on a siding, damaging it and injuring two sleeping trainmen.

31st, night, at the crossing near Florence, Col., an Atchison, Topeka & Santa Fé freight train ran into a Denver & Rio Grande freight during a heavy snow storm, wrecking the engine and six cars of the former and several cars of the other train. It is said that owing to the heavy storm the runner of the colliding engine was "lost," but supposed he was nearing the crossing, and was running about 18 miles an hour. One trainman killed and 2 injured.

And 8 others on 8 roads involving 3 passenger and 11 freight trains.

DERAILMENTS.

DEFECTS OF ROAD.

2d, on Iowa Central, near Rockwell, Ia., all the cars of a passenger train were derailed, by the breaking of a rail, while descending a steep grade, that portion of the train following the baggage car becoming detached and being overturned in the ditch. The smoking car caught fire from the stove, but little damage resulted. One passenger was seriously injured.

4th, on Chattanooga, Rome & Columbus, near Buchanan, Ga., a trestle gave way under a freight train, 10 cars going down with it, and the whole taking fire and being destroyed. Brakeman injured.

5th, on Cincinnati, New Orleans & Texas Pacific, near Tateville, Ky., two sleeping cars of a passenger train were derailed and overturned by a defective switch, slightly injuring 2 passengers.

6th, on Union Pacific, near Laramie, Wyo., a special train, consisting of two engines and two cabooses, was thrown from the track by a broken rail, and one of the locomotives and both cabooses were overturned. Five trainmen injured.

8th, on Central of Georgia, near James Station, Ga., the engine of a passenger train went through a trestle which had been undermined in a freshet, killing the engineer.

8th, 3 a. m., on Jacksonville Southeastern Line, near Havana, Ill., a southbound passenger train was derailed by a broken rail and badly wrecked, the engine being overturned and the baggage and smoking cars crowded against it. The three rear cars were not damaged, but the wreck took fire from the stove in the baggage car and was entirely consumed. Two passengers and 1 trainman were killed and 7 passengers and 4 trainmen injured. The victims were mostly in the smoking car. Two of the injured passengers were in the third car close to the Baker heater, and were slightly scalded in consequence of the breaking of steam pipes. No persons were injured by fire. A northbound train had passed over the road two hours before, and a trackwalker had inspected the track just before that, but the night was very dark and rainy, and the rain froze. The rail showed no signs of imperfection. It was made at Joliet in 1875 and weighed, when new, 56 lbs. per yard. The roadbed was in good condition, there being 17 8-in. oak ties to each 30-ft. rail.

8th, night, on Central of Georgia, near Haddock's, Ga., the engine of a slowly moving passenger train was overturned in the ditch at a culvert which had been undermined by a freshet, killing the engineer.

10th, on Chicago, Milwaukee & St. Paul, near La Crosse, Wis., a car of a passenger train was thrown from the track by a broken rail and overturned, slightly injuring a number of passengers.

10th, on Union Pacific, near Lehi, Utah, a passenger train was thrown from the track by the spreading of the rails. Two cars were thrown over on their sides, injuring 4 passengers, one of them severely.

11th, on Union Pacific, near Durkee, Or., a passenger train was derailed by a broken rail, injuring the conductor and 3 passengers.

12th, on Wheeling & Lake Erie, at Navarre, O., the mail, express and two following cars of a passenger train were derailed by a broken or defective switch. One of the cars was overturned and all four were badly damaged. The mail agent jumped off and, falling among some tree stumps, received serious injuries.

15th, on Iowa Central, at Beacon, Ia., a stock train was ditched by the breaking of a rail, wrecking several cars and injuring 2 trainmen.

18th, on Little Rock & Fort Smith, near Ozark, Ark., 3 coaches and a baggage car of a passenger train were derailed by the spreading of the rails, and toppled over. Conductor and 7 passengers were injured.

19th, on Kansas City, Wyandotte & Northwestern, at Bethel, Kan., the baggage car and three coaches of a passenger train were thrown from the track by the spreading of the rails and overturned. A number of of passengers were slightly injured.

24th, on Gulf, Colorado & Santa Fé, near Farmersville, Tex., a freight train broke through a trestle. One employé was killed, and another and the conductor and a brakeman were injured.

25th, on Atchison, Topeka & Santa Fé, at Sands, N. M., engine and 7 cars of a freight train were derailed and ditched by the breaking of a rail. Fireman killed, and engineer and brakeman badly scalded.

30th, on Philadelphia & Reading, near Shamokin, Pa., the rear car of a passenger train was derailed at a defective rail joint and thrown over on its side in the ditch, injuring 3 passengers and 1 trainman.

30th, on Chicago, Santa Fé & California, near Kenwood, Mo., the forward portion of a freight train went through a bridge which had been undermined by heavy rains, injuring 2 trainmen.

31st, on Central of Georgia, near Columbus, Ga., 15 cars of a freight train were derailed and ditched by the spreading of the rails, injuring 2 trainmen.

And 15 others on 12 roads involving 5 passenger and 11 freight trains.

DEFECTS OF EQUIPMENT.

13th, on Cleveland, Akron & Columbus, near Black Creek, a wheel broke under a car of a freight train while descending a grade and 10 cars were derailed and piled up in a bad wreck, killing a brakeman.

14th, on Philadelphia & Reading, at Cranberry Switch, Pa., the engine and several cars of a freight were derailed and thrown down a high embankment into a river by a broken brake-beam which had fallen from a preceding freight and lodged between the main and a switch rail. The engineer and fireman were killed and a brakeman badly injured.

17th, on Quincy, Omaha & Pacific, near Green Castle, Mo., the mail car and 2 coaches of a passenger train were derailed and ditched, by the breaking of a wheel under the former. One passenger was killed, and the conductor, mail clerk and 10 passengers were injured.

17th, on Norfolk & Western, near Goodes, Va., 9 cars of a freight train were derailed and badly damaged by the breaking of a wheel. Two trainmen injured.

25th, on Mobile & Ohio, in Meridian, Miss., a 6-wheeled engine while moving down a steep grade became uncontrollable by reason of some disarrangement of the throttle and was derailed and overturned. Engineer and a yardman injured.

And 12 others, on 9 roads, involving 3 passenger and 9 freight trains.

NEGLIGENCE IN OPERATING.

14th, on Missouri Pacific, near St. Louis, Mo., a yard engine was derailed by a misplaced switch and went over a 10-ft. embankment. A brakeman and a man riding on the front of the engine were killed. It seems to have been customary for men who were employés at factories to ride to and from their work on the front end of the engine.

18th, on Chicago Belt, at Sixteenth street, Chicago, Ill., the engine of a switching freight was overturned at a misplaced switch, injuring 3 trainmen, one of them fatally.

23d, on Louisville & Nashville, near Anchorage, Ky., the 2 rear sleepers of a passenger train were derailed by a switch being prematurely thrown. The derailed cars were hurled against a freight train standing on an adjoining track and badly damaged, injuring 6 passengers, one of them fatally.

27th, on Baltimore & Ohio, at Lewis Mills, O., a freight train ran into a tree, which had been felled by a telegraph lineman so as to obstruct the track, derailing and damaging the engine and several cars.

And 9 others on 8 roads involving 3 passenger and 6 freight trains.

UNFORESEEN OBSTRUCTIONS.

13th, on Baltimore & Ohio, near Forest Glen, Md., a westbound passenger train ran into a mass of rock which had been dislodged in a freshet and fallen upon the track in a cut. There being a curve at this point the train ran into the obstruction at full speed and the locomotive and forward cars were badly wrecked. Engineer seriously injured.

21st, on Pennsylvania, near Banian, Pa., the engine of a passenger train was derailed by an obstruction which had been maliciously placed upon the track, slightly injuring the engineer.

21st, on Newport News & Mississippi Valley, near Memphis, Tenn., a freight train ran over a cow, and 11 cars were derailed and wrecked, killing 2 tramps.

21st, on Great Northern, near Poplar, Mont., a freight train ran over a cow, and the engine and 15 cars were derailed and piled up in a very bad wreck. Brakeman killed, fireman seriously injured.

24th, on Union Pacific, near Brighton, Col., a freight train was derailed at a point where snow and sand had drifted upon the roadbed, killing the fireman and injuring the engineer.

And 11 others on 10 roads, involving 3 passenger and 8 freight trains.

UNEXPLAINED.

3d, on Bellaire, Zanesville & Cincinnati, at Sarahsville O., a passenger train was derailed and 2 coaches overturned. Two passengers were seriously and several others slightly injured.

5th, on Richmond & Danville, near Chapel Hill, S. C., a passenger train was derailed and 2 cars badly damaged. Conductor and several passengers injured.

9th, on Bellaire, Zanesville & Ohio, near Zanesville, O., a car of a passenger train was derailed and overturned, slightly injuring several passengers.

11th, on Richmond & Danville, at Danville, Va., the tender of the forward engine of a double-header passenger train jumped the track, derailing and ditching both engines and several cars. One trainman killed and 4 injured.

12th, on Colorado Midland, near Leadville, Col., 2 cars of a passenger train were derailed and thrown down an embankment, slightly injuring several passengers.

12th, on Chesapeake & Ohio, at Bethpage, Tenn., a passenger train was derailed and the mail car and a coach were thrown down a 15-foot embankment. One passenger injured. The ditched cars caught fire from the stoves and were burned up.

13th, on Louisville, New Orleans & Texas, near Greenville, Miss., a mixed train was derailed and 2 coaches thrown down an embankment, injuring 2 passengers.

14th, on Richmond & Danville, near Richmond, Va., engine and 4 cars of a passenger train were derailed, slightly injuring several passengers.

17th, on Missouri Pacific, at Otterville, Mo., a freight train was derailed in the yard and one of the cars knocked off a part of the cab of a switch engine on an adjoining track, killing the engineer. A number of cars were also damaged.

20th, on Philadelphia & Reading, near Barry Station, Pa., the engine and 32 cars of a freight train were derailed and went over an embankment, making a bad wreck. Engineer and fireman and an engineer riding home on the locomotive were killed and 4 other trainmen were seriously injured.

21st, on Louisville, New Orleans & Texas, at Rosedale, Miss., a passenger train was derailed and the engine and several cars were badly wrecked. Engineer and fireman killed and a number of passengers injured.

21st, on Louisville & Nashville, in Louisville, Ky., a passenger train was derailed at a switch, badly damaging the engine. Engineer killed and fireman fatally injured.

23d, on Southern Pacific, near Gila Bend, Ariz., several cars of a freight train were derailed and wrecked, injuring 3 trainmen.

29th, on Pennsylvania, at Devon, Pa., the day coach and 4 following sleepers of a passenger train running rapidly were derailed on a curve, all the sleepers being overturned and dragged some distance. The only persons injured were 3 passengers.

29th, on East Tennessee, Virginia & Georgia, near York, Ala., 7 cars of a freight train were derailed and wrecked, killing a trainman.

31st, on New York & New England, near Windermere, Conn., a passenger train was derailed and the express car thrown down an embankment and badly damaged.

31st, on Indiana Midland, near Lebanon, Ind., a passenger train was derailed and one of the coaches overturned, injuring 2 passengers.

And 31 others on 26 roads involving 6 passenger and 25 freight trains.

OTHER ACCIDENTS.

8th, midnight, on New York Central & Hudson River, near Cranesville, N. Y., a car of a passenger train containing baggage and mail was found to be on fire and before the train was stopped and the flames controlled, much of its contents were destroyed.

19th, on Cumberland Valley road, near Oakville, Pa., a passenger train moving at about 30 miles an hour, ran over a team at a grade crossing and a piece of the demolished wagon went through the window of one of the passenger cars and slightly injured a passenger.

And 8 others on 8 roads involving 6 passenger and two freight trains.

A summary will be found in another column.

Electric Welding.

It is only two or three years since welding by electricity has been looked upon as anything but a laboratory experiment, and, although most of the work has been done by one company, there are few branches of electrical engineering that have made more real progress, and none that has given greater satisfaction from the first. Our readers are familiar with the general results obtained—the varied applicability of the process, and the perfection of the welds.

The two pieces of metal to be welded are firmly held by two clamps, which also form the electrical connection, and the ends to be joined are pressed together. An electric current of immense volume is passed through, bringing the ends to welding heat, then is switched off and with many metals the weld is complete. With others, however, it is necessary to do some hammering, and, instead of cutting off the current entirely, just enough is allowed to pass to keep the metal at the desired temperature until everything is finished. Steel is welded perfectly and without difficulty, and many other metals impossible to weld in any other way are entirely tractable with electric welding.

An alternating current is used because of the simplicity of the regulating devices and the ease with which they can be handled. The current is derived from a generator built something after the Thomson-Houston type of alternator. Sometimes it is most convenient to use a current of comparatively high pressure and transform this into one of low pressure but proportionately greater volume (as is the custom in all systems of alternating current, incandescent lighting), while in other installations it is best to use a dynamo generating a current of such low pressure that transformation is unnecessary.

Riveting boilers, welding the links of chains, bridge work, etc., were among the earlier applications of electric welding. The welding of wire and wire cables is another important use to which it is put, particularly the cable work, as it is found that joints so made are of about the same strength as the rest and retain perfectly the flexibility. Since the heat is concentrated at the point of welding, and so does not injure the insulation, this method is used largely to make continuous the insulated wire and cables for electrical work. Recently a company has been organized to manufacture projectiles for heavy artillery, the parts to be electrically welded.

The most recent use is in welding rails. Owing to the difficulty of maintaining rails in crowded and paved streets, it is an advantage to have the rails as long as possible, thereby reducing the number of joints to be cared for. For a year past the Johnson Company, of Johnstown, N. Y., has been experimenting on welding rails up to 110 lbs. per yard, and now there is being built for the company by the Thomson Electric Welding Company one of the largest machines ever built for welding. It is to weigh from 20 to 25 tons, and occupy a floor space of 8 by 14 ft.

To give some idea of the comparative cost of electric and the best methods of fire welding, extracts are quoted from a letter written by Messrs. Clarke Chapman & Co., of Gateshead-on-Tyne, England. This firm makes electric and other machinery, and has one electric welder, of limited range, and also does much of the same work by the best of fire methods. The company says: "This is a sample of a week's work taken at random, which we

think fairly represents the profit and loss aspect to us of the application of electric welding. There are several other considerations which apply to all possible users: (1) Superiority of welds thus obtained over fire welds; (2.) decrease in number of expert smiths; (3.) the electric welding process enables articles to be welded in forms unattainable in fire welding, which leads to other improved developments of manufacture. Further, in our case (from special circumstances under which our installation was made) we have to show a debit, not only for this plant, but separate pay for engineman in charge. These items would not exist in the returns obtainable under the most advantageous condition of working, where existing engine power could be utilized."

Detailed figures of the week's work are as follows for the week ending March 18, 1891:

Cost of operating electric welding plant.			*Cost of manufacture of the same product by present forge fire method.*		
1 smith, 53 hours at 33s.	£1	13 0	180 winch stays at 2d.	£1	10 0
1 lad, 53 hours at 14s.	0	14 0	80 connecting rods at 4½d	1	10 0
1 engineman, 53 hours at 23s.	1	3 0	41 brake straps at 8d.	1	7 4
Cleaning boiler	0	1 6	212 winch handles at 2¼d	1	19 9
Coals—33 cwts.	0	17 0	168 eccentric rods at 2d.	1	8 0
Wear and tear and depreciation	0	12 6	168 piston rods at 2d.	1	8 0
Interest on £1,000	0	19 3	Total	£9	3 1
Glaze wheel grinding	0	0 9		6	1 0
Total	£6	1 0	Saving	£3	2 1

The statement shows a saving by the electric welding method of £3 2s. 1d., or 34 per cent.

Bentley's Vestibule with Janney Coupler.

The leading feature of this form of vestibule connection for cars is the endplate carried by a swinging drawbar. The drawbar is normally held in its central position by heavy springs, with the necessary range.

The drawbar as shown in figs. 2 and 6 of the accompanying illustration consists of two wooden beams with the coupler between them. On the inner end of the beams are the follower plates, and on the outer end are two buffer rods which are linked to the coupler in the usual manner and carry the endplate.

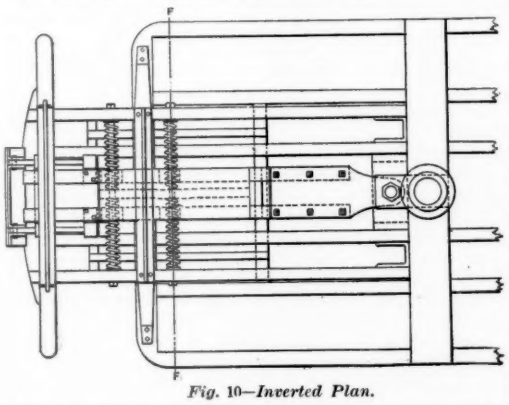


Fig. 10—Inverted Plan.

The endplate is pivoted on a transverse horizontal axis to the outer ends of the buffer rods, the inner ends of the rods being rigidly held together so that they move as one. The plate is held upright, not rigidly but somewhat loosely, by broad bearings on the platform end sills; see figs. 2 and 4. The corner stanchions of the vestibule are hollow, as seen in fig. 3, and contain vertical spring rollers. From each of these rollers a canvas sheet or panel extends to one edge of the end plate, so that as the plate moves from side to side the end of the vestibule is always closed.

The following points should be especially noted: The buffer action is concentrated at the end sill of the platform, but the buffer springs are unusually strong and act on a lateral base of considerable width, while the tortional thrust of the end sill is transmitted by the upright stanchions to the roof timbers, which, in new cars, should be continued to the end of the vestibule. Thus, it is claimed, is obtained, by a buffer not differing essentially from those long in use, a steadying effect to the cars which it is a part of the function of the modern vestibule to secure. The centering springs for the drawbar, which may be seen in fig. 9, are long and open, but of considerable stiffness proportioual to the weight of the car, so that at high speeds and on curves each car will have substantially the same intimate connection with and control over the adjacent cars that is secured by the ordinary rigid coupling, but in addition the constant lateral jerking so noticeable on curves is modified. Considerable lateral space under the platform is required for the swinging drawbar, and in consequence supplementary bracing for the platform is provided in the manner indicated in figs. 9 and 10.

A special connection from the platform lever to the catch lever of the coupler is required, so that the latter may be operated independently of the movement of the drawbar. This is provided by the arrangement shown in figs. 1 and 5, where there is a series of rods and levers reaching from the platform lever back to the pivotal point of the drawbar, and thence to the catch lever of the coupler.

This vestibule arrangement interchanges with Pullman vestibules and is automatic throughout. It is also claimed to be quite independent of the various Pullman patents.

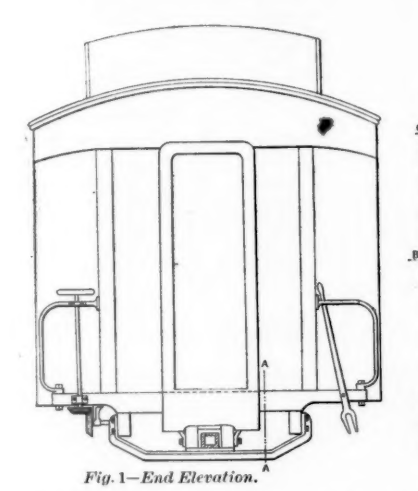


Fig. 1—End Elevation.

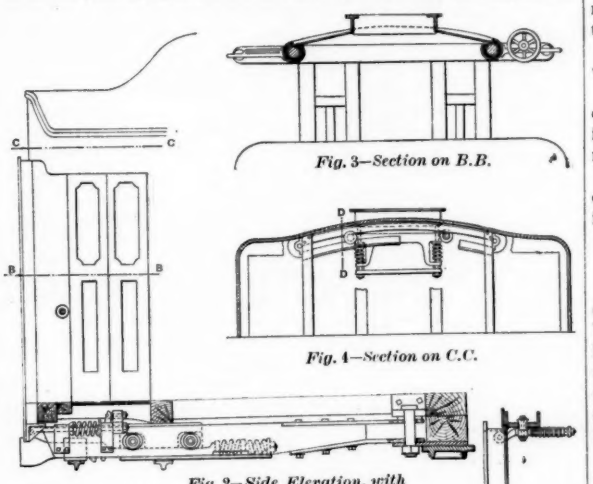


Fig. 2—Side Elevation, with section on A.A.

Fig. 3—Section on B.B.

Fig. 4—Section on C.C.

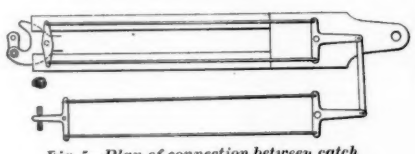


Fig. 5—Plan of connection between catch lever of coupler and platform lever.

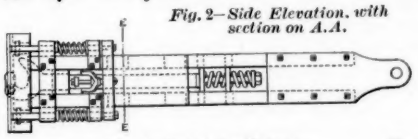


Fig. 6—Swinging Drawbar.

Fig. 7—Section on D D.

Fig. 8—Section on E.E.

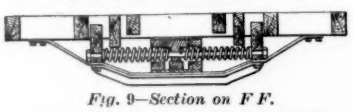


Fig. 9—Section on F F.

E. M. BENTLEY'S VESTIBULE END PLATE, WITH JANNEY COUPLER.

The "Cincinnati."

The Pennsylvania, double-deck, propeller ferry-boat "Cincinnati" was launched on the 25th inst. at Elizabethport.

The hull was built by the S. L. Moore & Sons Co., and some of the dimensions are as follows:

Length over all	206 feet.
" molded	180 "
" water line	202 "
Beam over guards	65 "
" molded	46 "
Depth amidships	17 "
Draft	10 ft. 3 in.
Displacement, about	811 tons.

The engines were built at the Pennsylvania shops at Hoboken, under the supervision of Mr. H. S. Hayward, Superintendent of Motive Power of the New York Division. There are two compound engines of the steeple pattern, each 18 in. and 36 in. × 26 in. They are connected directly with the shaft running the entire length of the boat. With 120 revolutions a minute the engines are expected to develop 1,000 horse power, with a speed of 12 knots an hour. The engines are equipped with Canfield's patent balanced valves.

The two boilers are 16 ft. long, 10 ft. diameter, and have 100 sq. ft. grate area. They will carry a pressure of 100 lbs. to the square inch, but have been tested to 160 lbs. There are two corrugated furnaces in each boiler, 38 in. inside diameter, made by the Continental Iron Works, of Brooklyn.

The propeller wheels are 8 ft. 6 in. diameter, with 11 ft. pitch.

The vessel will be equipped with Williamson's steam steering gear, with two engines, one in each end of the boat, and the Sturtevant hot air heating and ventilating system. She will be lighted by electricity, having one of the United States Electric Company's dynamos of 175 lights of 16 candle power. In addition there will be a small engine and dynamo to light the interior of the hull in the daytime, and this will be connected with the signal lamps to be used in emergency or in case of accident to the main lighting plant.

Water tight, collision bulkheads are liberally provided.

The joiner work is being done by J. E. Hoffmire & Son, of New York, and will be very elaborate, the inside finish being hard wood, with mahogany panels and trimmings.

Access to the upper cabins will be by two grand staircases, one on each side of the boat—where the wheel box is located on a side-wheeler.

The Morden Frog & Crossing Works.

One of the largest frog and crossing works in this country is at South Chicago, on the line of the Fort Wayne and Lake Shore roads. The great number of lines entering Chicago make that city one of the largest fields for this class of work. For instance, the order for crossings, turnouts, etc., at the Stewart avenue and Grove street crossing (see *Railroad Gazette*, April 24), is enough to keep a small plant busy for a half year.

The Morden Frog & Crossing Works are well equipped with good tools. Most of the work is done under one roof. The main building is 102 ft. by 300 ft. There are ample light and air which facilitates the overseeing of the different parts of the work. Adjoining this is the boiler house and an ample store room. The number of men employed is about 150, and the capacity of the works is about ten or eleven hundred frogs and the same number of switches with stands, and from eighty to one hundred crossings per year. Mr. John McKinnon, the superintendent, is making some improvements in the way of machinery for bending the rails, and forming the splice and filling pieces. In the cold bending machine it is so arranged as to allow, by means of a worm attachment, the rapid increasing of the length of the blow, or pressure, from a heavy revolving cam. By the use of this the work can be quickly turned out and also at a considerable saving in labor.

In the matter of filling for frogs the wrought-iron block is usually put in, and some cast iron; but as a too rigid foundation is fully as detrimental to the rail as the opposite condition, it is thought by many that some form of filling which will allow a little spring between the rails will give an easier riding and longer wearing frog. This U-block filling, though not exactly new, may still be of interest to some. The piece of wrought-iron plate is pressed into a form or die, the angle of the sides of which correspond to the angles in the fish of the rails, and the finished U-block is bolted securely to the rails the same as an angle bar splice. Notwithstanding this spring allowance is small, still the lessening of the anvil-like resistance will probably lengthen the life of the rail. In building crossings for two double tracks or more the usual practice is to cut off and bend out the guard rails between any two tracks, in this way saving several feet of rail each time, or eight times for a two double-track crossing. This produces a very weak spot between each of the two tracks, as there are two short pieces of rail fastened together with a pair of ordinary splice bars. If, however, the guard rail extends from one track over to the other, and the main and guard rails are fastened at their ends (which are opposite each other) with a pair of splice bars and blocking between the rails, there is strength added to the crossing that will keep it in much better shape.

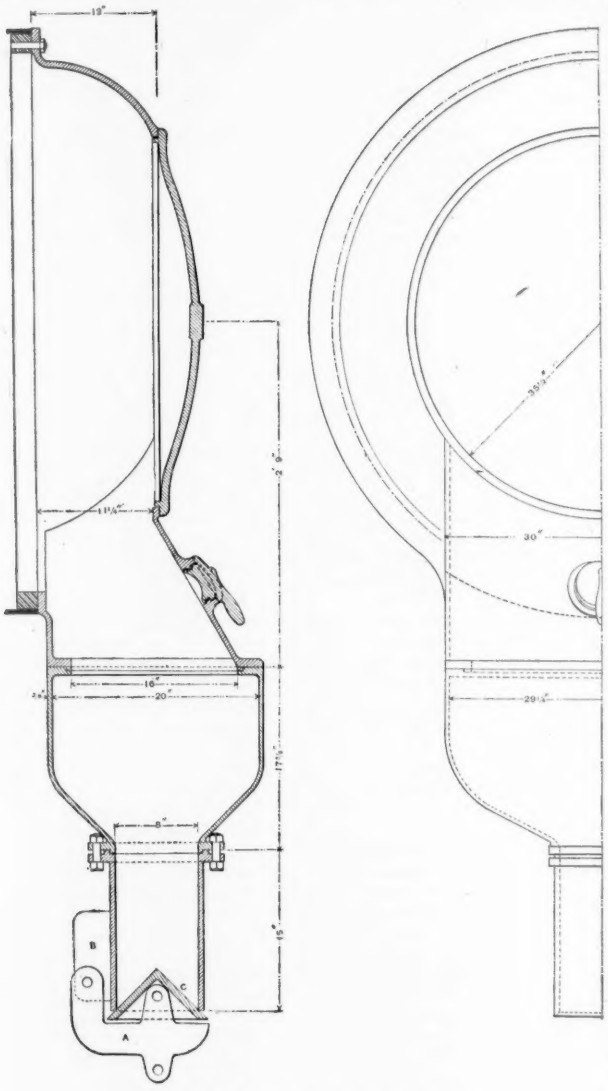
This company is now building, besides the usual run of frogs, switches and stands, a number of crossings and large angled slips for several of the Western lines, and is commencing on work for quite an extensive change in the plan of the tracks at Stewart avenue and Grove street, Chicago.

It is stated that there is an increasing amount of attention paid to the details of crossings and frogs each year. Roadmasters are taking more pride in the easy riding of their main line switches and their grade crossings, and special attention is often required of them to the good design and workmanship of crossings on lines where trains run the crossings at high speed. This part of the maintenance of way is becoming more and more important, on account of the increasing weight of rolling stock and the greater speeds at which all the trains are run. It is of common occurence to run special merchandise and stock trains close behind through passenger trains from one division to another, and a line will obtain freight without cutting the rates simply on its ability, on account of the good condition of its track, to make several hours' better time than its rival on a six or eight hundred-mile run. This means of beating the other fellow is unremittingly advertised, and it consequently has devolved more than ever of late upon the superintendents to see that the crossing and frog work on their divisions is not only kept up but yearly made better.

Extension Fronts on the Great Northern.

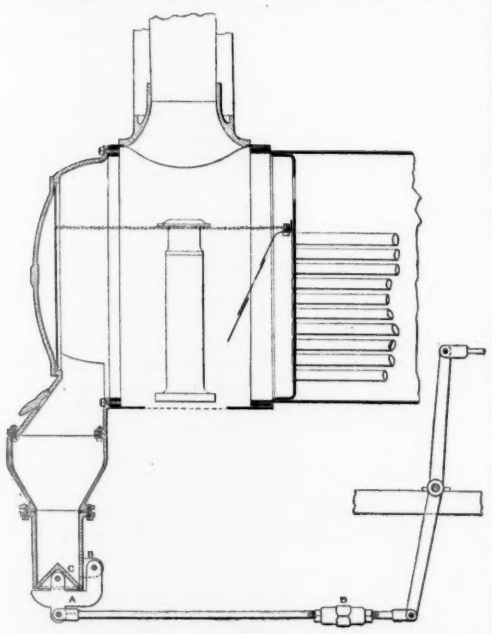
Mr. J. O. Pattee, the Master Mechanic of the Great Northern, has been putting on a number of engines an extension front end designed by him. The total projection forward of the flue sheet is not great, and, on account of the position of the cinder pocket, its effectiveness as a spark arrester is exceptional.

The cuts show the details and the arrangement of the deflectors and netting in the arch. The whole front is



Cinder Pocket.—Great Northern Railway.

of cast iron, the larger pieces being but three in number, besides the door, which is fastened in the usual way with hinge and straps. The small hand hole in front



Extension Front—Great Northern Railway.

facilitates inspection and cleaning whenever the mass of cinders becomes caked and clogs.

The main casting is fastened to the heavy wrought-iron ring with studs, and from it are suspended the lower parts of the hopper in which the cinders lodge. The cone *C* at the bottom is swung from the lug *B* cast on the back of the pipe by means of the bell crank *A*, and is worked by the rods running to the cab, as shown, the turnbuckle *D* being used to regulate the length of the rod. Comparatively little trouble is experienced with this seat becoming loose, as the cinders after falling into the hopper soon cool.

The netting extends straight across the whole distance forward of the flue sheet, instead of having a blank sheet out to the exhaust nozzle.

Although the subject of spark arresters is somewhat neglected on many lines, still on the lines traversing the large timber districts there is of necessity, much interest in producing some device by which the cinders shall be kept in and yet allow of a free passage of the gases out of the stack. In the usual extension end the cinders are heaped up in the lower front corner, and as the gases coming from the flues are deflected downwards by the baffle plate and then curve toward the front, these cinders are constantly churned and choke up the netting. This is in a large measure relieved by the arrangement of the short extension front here given. The cinders are driven directly into this lower box, and rapidly cool, and are out of range of the escaping gases, so that there is much less solid matter thrown against the netting.

Commission Payments on Local Ticket Sales.

The Atchison, Topeka & Santa Fe pays its station agents a portion of their regular compensation in the shape of commissions on ticket sales, and has had the system in use four months. This experience is not extensive enough to warrant conclusions in regard to the permanent advantage of this plan as compared with the customary method of compensating agents by a fixed salary, but the results, as far as noted, are, we understand, very satisfactory. Below is the essential portion of the superintendent's circular announcing the establishment of the system.

Commencing Jan. 1, 1891, a commission will be paid upon all regular rate, local ticket sales, but not upon coupon or local excursion sales.

In establishing the rate of commission, we have taken the ticket sales for six consecutive months prior to August, 1890, and upon a monthly average thus obtained based the per cent. of commission for each station. A reduction in salary has been made to correspond, as near as practicable, to the amount of commission; in the majority of cases the net result to the agent is the increase of a few cents in his average salary; in a few cases the reduction of salary is the result. There is no intention or desire, however, that the introduction of this commission system shall reduce salaries, but on the contrary it is hoped, and believed, that extra effort on the part of each of you will show increased sales, and thus be the means of adding to your present salary.

Cash fares to the extent of about ten thousand dollars are paid monthly upon our trains; the bulk of this should be paid at the ticket window, and by proper effort on your part this will be accomplished, and I believe to the interest of all concerned. The company intends revising the percentages paid as often as justice to all concerned seems to warrant. While some particular month may show a decrease in net salaries to some, a fair trial upon the present percentages, we believe, will prove they are in the direction of increased revenue to you, and if after a few months under the proposed basis any one finds his monthly salary permanently reduced, an application to his immediate superior for a readjustment will entitle him to prompt and favorable consideration.

I hope each of you will enter into this heartily, with an earnest effort to make it a success, as I believe it is in the direction of better service and pay, and mutually advantageous to the company and yourselves.

For Better Roads.

A meeting was held at the house of the American Society of Civil Engineers the evening of April 28 on the call of a dozen engineers and others interested in the improvement of our highways, which resulted in the formation of the "Seaboard Road Association," with the declared object of "stimulating national, state, county and individual efforts towards restoring, rebuilding and improving the old highways along the Atlantic coast and the main routes of inland communication connected with them."

The management of this association is vested in a governing committee of 15 members, having power to increase their own number and to appoint state and other local associations to work in furtherance of its objects. So far as appointed the Governing Committee are: E. P. Carpenter and Col. A. A. Pope, of Boston; A. F. Noyes, of West Newton, Mass.; Jno. A. Coleman, Providence; A. J. Cassatt, Philadelphia; James Owen, Montclair; F. A. Dunham, Plainfield, N. J.; Jas. R. Dunn, President American Wheelmen's League; Charles L. Burdett, Hartford, Conn.; John Bogart and Edward P. North, New York.

The first effort of the association will be directed to the improvement of the old New York and Boston post road along the shore of the Sound through Providence to Boston, and also to connect the very good macadam roads of eastern New Jersey, which end about Rahway, with the roads between Trenton and Philadelphia. The old New York and Boston road, or King's road as it is still called in parts of Connecticut, passes through a populous and wealthy section, and has already a good deal of excellent macadam, *e. g.*, about 70 miles about Bridgeport, some 30 miles near New Haven, and a less amount about Providence and Pawtucket.

The completion of this scheme would give about 340 miles of direct and continous good roads and it is hoped by the members of the association that it would prove more efficient as an object lesson than a greater mileage in scattered pieces.

The cost to the country of our present wretched roads, by preventing produce reaching markets and increasing the cost of what is brought, and by delaying traffic, is incalculable. It often costs more to haul a load of corn eight or ten miles over a country road than to carry it from Chicago to New York. The success of such efforts as this to improve common roads seems to promise greater good to the communities affected than almost any other enterprise, for the present high cost of transportation by wagon must be subtracted from the gains of either the producer or consumer of all products so transported.

The "Clyde" Piston Ring.

We illustrate herewith a form of piston ring which has been invented by Mr. James Menzies, 52 Mount street, Glasgow, and which is claimed to be extremely simple, safe and efficient. We understand that it has been applied in a number of marine engines, under exceptionally severe conditions, and with the best results.

The construction of the ring will be understood from the illustrations. Fig. 1 of which represents a horizontal section; fig. 2 a plan of the spring and rings; figs. 3 and 4 represent a modification, and fig. 5 shows a general view of the complete ring, for which the following advantages are claimed: When the junk ring is screwed down, the rings and springs are bound together, leaving the packing practically in one piece. By fitting the body

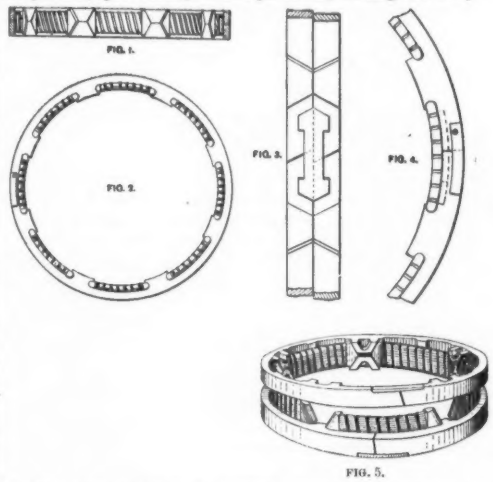


FIG. 5.

of the piston to the parts formed on the inner surface of the rings, the packing is supported under shocks and the piston under oscillations. The vertical pressure remains constant, the springs and pressing heads not being subject to wear in the slightest degree, while the adjustments are independent and allow either the vertical or lateral pressure to be increased or diminished as desired. The arrangement is said to have all the elasticity and rigidity required to keep the cylinder in good order when the engine is new or the cylinder in fair condition, and when cut in sections and fitted to an unequally worn cylinder results are obtained which give general satisfaction. All the springs in the ring are interchangeable except the one fitted at the saw-cut section. The modification shown in figs. 3 and 4 is particularly applicable to pistons for new cylinders.—*Industries.*

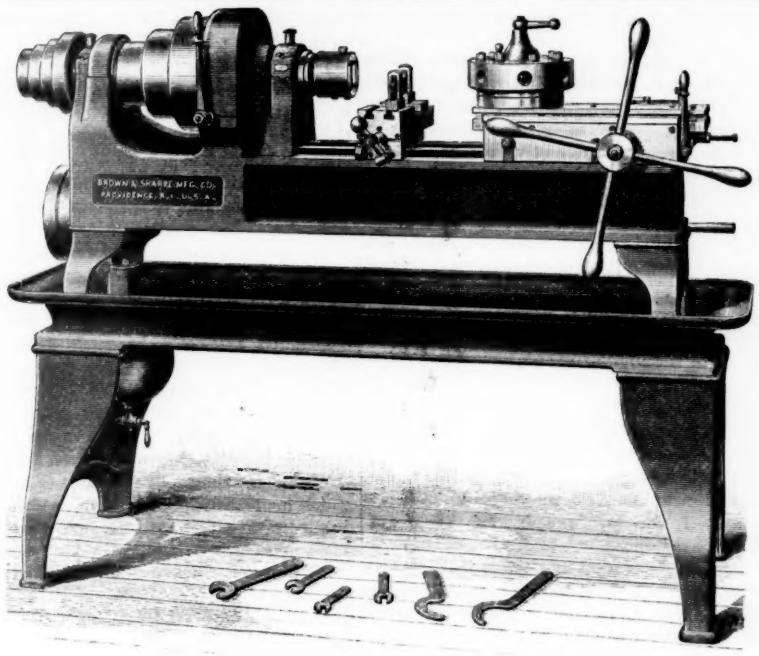
New Screw Machine.

The engraving shows the new "No. 6" screw machine recently put out by the Brown & Sharpe Manufacturing Co., Providence, R. I., which is briefly described as follows:

The head is back geared and the change from belt speed to back gears is effected without stopping the spindle by a friction clutch, which is practically positive in its action and will hold the full belt power of the machine. The "back gears" are underneath the spindle cone and are entirely inclosed. The gears on the cone are also inclosed. The back gears are 4.63 to 1.

The spindle is steel. Its front bearing is hardened and both bearings are ground. It has a hole $1\frac{3}{16}$ in. diameter and the front end is fitted for a chuck. The end thrust is taken by the rear box and received directly on a hardened steel nut and washers. The spindle boxes are $2\frac{1}{4}$ in. and $2\frac{1}{16}$ in. diameter, $3\frac{1}{16}$ in. and $2\frac{1}{16}$ in. long. They are steel, hardened and ground.

The turret is fed automatically or by hand and has eight speeds, as each of the four speeds given by the feed cones may be varied by shifting a lever, so that without changing the belt the tools may be fed fast or slow for each step of the cone, a novel feature in screw machines. The turret is $9\frac{1}{2}$ in. diameter and has seven holes, $1\frac{1}{4}$ in. diameter. The movement of the turret head slide is $9\frac{5}{8}$ in. and the extreme distance between



NEW No. 6 SCREW MACHINE.

Made by BROWN & SHARPE MANUFACTURING CO., *Providence, R. I.*

the face plate and the turret is 32 in. The length that can be drilled, or milled, without moving the turret head slide bed, is 6 in. The swing over the tool post slide is 6¼ in.; swing over bed, 13½ in. and length of bed, 56 in.

The counter-shaft has friction pulleys 14 in. in diameter, 3½ in. face, and should run about 175 revolutions per minute.

TECHNICAL.

Manufacturing and Business.

B. M. Jones & Co., 13 Oliver street, Boston, representatives in the United States of Samuel Osborn & Co., Sheffield, England, the manufacturers of the "Mushet" steels, have opene i a branch office at 143 Liberty street, New York. The firm is also agent for the "Taylor" Yorkshire iron for staybolts, piston rods, etc.

The Spiral Weld Tube Co., of Orange, N. J., has received an order for several miles of spiral-welded pipe for air and steam purposes. The order is from C. F. King & Co., of Ebervale, Pa., who have a contract with the Jeddo Tunnel Co., Ltd., of Jeddo, Luzerne County, to drive two tunnels and sink an airway for draining anthracite mines. The company has also recently received a very large order for 20-in. pipe.

At the works of the National Tube Works at McKeesport, Pa., 600 men are idle on account of the scarcity of coke to operate the different departments.

The Colorado Springs Rapid Transit Co. is about to build a machine shop, and equip it with lathes, drill, wheel, press, and other shop tools.

A reorganization of the Virginia Steel Car Co. has taken place. Col. Robert Catlett has been elected President, instead of A. S. Buford, resigned. Mr. Foster was elected Vice President, and Joseph A. Moore Secretary and Treasurer. The other directors are Gen. Fitzhugh Lee, Wm. A. Anderson and W. W. Green, of Chicago.

At a recent meeting of the stockholders of the Litchfield Car & Machine Co., Litchfield, Ill., the following officers were elected: President, D. Davis, Sr.; Vice-President, C. F. Coltins, of St. Louis; Secretary and Treasurer, J. B. W. Amsden.

The Cole Mfg. Co., Lake Village, N. H., is making arch bars and transoms for 50 freight cars for the Concord road, also 400 car axles.

Iron and Steel.

The Cambridge Iron & Steel Co. is erecting an addition to its plant at Cambridge, O., and will soon be making 750 tons of iron and steel sheets per month. The original plant was put in operation during the summer of 1890.

The Keystone Rolling Mill Co., Ltd., at Pittsburgh, is rebuilding its furnaces, and will hereafter use coal as fuel.

Gen. D. W. Flagler, Washington, D. C., will receive proposals until May 11 for the following for the Ordnance Department, United States Army: Twenty-five sets of steel forgings of American manufacture for three 2-in. field guns, and 10 sets each of steel forgings of American manufacture for 8, 10 and 12-in. guns.

The work of removing the Newport (Ky.) Rolling Mill to Salem, Va., is to begin at once. The new concern will be known as the Salem Rolling Mills Co., capitalized at $100,000.

A cotton-tie mill is to be built at Cardiff, Tenn., by the Cardiff Rolling Mill Co. The Lloyd-Booth Co., of Youngstown, O., will supply the machinery for the plant, the Brass Foundry & Machine Co. of Fort Wayne, Ind., the engines, and the Hazleton Boiler Co., of New York, the boilers. The muck mill, with its ten puddling furnaces and machinery, will occupy a building 50 × 75 ft. in size, with two wings 30 × 70 ft. each. The size of the finishing mill will be 50 × 200 ft.

The works of the Union Steel Works of Louisville, Ky., are to be removed to Lexington, Va. Work has already commenced on the new plant.

The plant of the St. Louis Steel Foundry, in East St. Louis, recently burned, will be rebuilt at once. The new plans provide for doubling the capacity of the plant.

The capacity of the furnaces which Howard & Sears intend erecting at New Castle, Va., for the purpose of making steel by the Adams direct process will be 100 tons per day.

The entire plant of the Katahdin Iron Works, in Maine, has been purchased by a syndicate, and will be transferred to East River, in Pictou County, N. S, where iron is abundant. Over 300 hands will be employed. Among those interested are Mr. Fraser, of New Glasgow, and R. G. Leckie of Londonderry, N. S.

On Tuesday, April 14, 130 tons of machinery for the armor plate plant of Carnegie, Phipps & Co., Ltd. at Homestead, Pa., arrived at Baltimore. The machinery is to be used on the contracts for plate for the new ships.

The machinery is arriving at Glasgow, Va., for the Glasgow rolling mill. There are three buildings, each 192 × 60 ft. The mill will contain 18 puddling furnaces, but the number of heating furnaces has not yet been determined upon. Fuel gas will be used.

The Rail Market.

Steel Rails.—The market is dull, and no large sales have been made, but there are some inquiries in the Western mills. The quotations are: at New York, $30.75 @$31; at Pittsburgh, $30 on cars, and at Chicago, $31 at mill.

Old Rails.—The following are the quotations: At Chicago, old iron rails, $22.75, and old steel rails, $13.50@$15, according to length; at Pittsburgh, iron rails $23.50 @$24, and steel rails $17@$17.50.

New Machine Shops and Stations.

The contracts will be let this week to build a new union station for the Richmond & Danville and the Seaboard Air Line at Raleigh, N. C. The building will be 131 × 62 ft. long.

The Norfolk & Western will build a new station at Glasgow, Va., which it is reported will cost $15,000.

The American Car & Equipment Co. has practically suspended, and will be put into the hands of a receiver in a few days. No definite statement of the liabilities can be obtained.

The Northern Pacific proposes to build new machine shops at Missoula, Mont., and will soon order the machinery. It is also to build a freight house. The various improvements at this town will probably amount to $60,000. The company is to build a roundhouse and repair shops at Ocasta, Wash. Plans have been prepared for a bridge and a stone passenger station, to cost $100,000, which it is proposed to erect at the foot of Columbia Street, in Seattle. The building of the station will probably be delayed a year, to secure a clear title to the site.

Geo. A. Proctor, of Sarnia, Ont., has been awarded the contract for erecting the new Grand Trunk station to be located near the entrance to the St. Clair tunnel. The plans provide for a one-story brick building, on a stone foundation, 165 ft. long by 32 ft. wide. There is a central projection of 7 ft. containing large windows, surmounted by a tower.

The Wheeling Bridge & Terminal Company has plans prepared for its union passenger station to be erected at the corner of Market and Eighteenth streets, at Wheeling, W. Va. The new station will be built to accommodate all the roads entering the city. The work on the new building will be commenced as soon as the ground can be cleared.

The city council of Dallas, Tex., has granted the Texas & Pacific an extension of 60 days in which to commence the erection of its new station and office building. The plans provide for a five-story structure, 60 × 100 ft., to cost about $75,000.

The Boston & Albany is to erect a new passenger station 30 × 70 ft. at Warren, Mass. The building will be of Milford granite, with brownstone trimmings. A similar station will be built at Huntington, and a smaller one at Charlton, Mass.

The Proposed Detroit River Tunnel.

The Michigan & Canada Tunnel Co. was organized at Detroit, Mich., last week, to build the proposed railroad tunnel for the Michigan Central under the Detroit River, from near Sixteenth street, Detroit, to Windsor, Ont. It is stated that work will begin this week at the Detroit end of the tunnel and will be carried forward as rapidly as possible. The preliminary work will take up several months, and it is proposed to begin the work of excavation late in the summer. The tunnel will be double track and will be about 8,000 feet long. The contract time for the completion of the work is two and a half years. Among those present at the meeting at which the tunnel company was organized, were: D. O. Mills, of New York; James Ross, of Montreal; George Bliss, of Morton, Bliss & Co., New York; General George S. Field, of New York, and Andrew Onderdonk, of Chicago. The Michigan Central is understood to be financially interested in the enterprise.

The Verrugas Viaduct.

Engineering of April 17 contains several illustrations of the new Verrugas viaduct, during construction and after completion, with a short account of the work. The structure was designed by Mr. L. L. Buck, of New York, and made by the New Jersey Steel & Iron Co., of Trenton, N. J. Their contract, however, did not include erecting. The work of erecting was superintended by Mr. P. A. Fraser, engineer for Messrs. Grace Brothers, and Mr. A. D. Riffle, assistant to Mr. Buck. A bridge gang was sent out from the United States. The whole structure is 575 ft. long. It consists of two cantilever spans and a middle connecting span. The cantilever spans are carried on piers, one of which is 122 ft. high and the other 142 ft. 6 in.; they are 235 ft. apart. The shore arms of the cantilevers are 140 ft. The other arms 65 ft. each, and the connecting span 105 ft. The tower portion of the cantilever is 30 ft. in each case. The bridge is on a grade, and the base of rail is 250 ft. above the bottom of the chasm. The original viaduct fell because it had a central tower rising from the bed of the stream, which was swept away by a landslide in a very extraordinary flood. After the destruction of this bridge one line of rails 250 ft. long was held together by the fishplates, spanning the whole abyss. The old piers and the spans which were left standing were used as scaffolding. The time occupied in erecting was 98 days.

Rail Making in New South Wales.

Recent correspondence of the *Engineer* indicates that rail mills may be started in New South Wales. The government is said to have decided to invite tenders for 175,000 tons of steel rails. They are to be made from material furnished entirely by the colony, and with coal, coke or other fuel produced in the colony. The delivery of the rails is to be commenced in January, 1893, and spread over a period of five years. For three years the rate is to be at the rate of 25,000 tons a year. The prices are to be determined on the basis of the average price ruling in London or Liverpool at the beginning of each year, plus ordinary freight and insurance. The Minister for Works is to have power to terminate the contract on six months' notice. Tenders will be received by the Minister in Sidney, or by the Agent-General of the Colony in London, up to the 24th of next June.

The following table shows the average prices of deliveries in Sidney from January to June, 1890.

	Tons.	Price in England. £ s. d.	Cost in Sidney. £ s. d.
Bull heads	912	5 13 6	6 11 4
Tees	847	5 13 6	6 11 7
Double heads	426	4 18 3	5 14 2
Street	671	5 1 6	5 18 0

THE SCRAP HEAP.

Notes.

The Pennsylvania House of Representatives has resolved to put the Anti-Discrimination bill on the calendar; and this by a vote sufficiently large to secure its passage, but it is not by any means sure that the bill will pass both Senate and House. The Legislature has had before it for 18 years the duty imposed by the Constitution of enforcing by appropriate legislation the provisions of Article XVII, but it has never performed that duty.—Philadelphia *Public Ledger*.

The Terminal Improvement Co., a concern controlled by capitalists interested in the New York Central, is erecting a block of warehouses in New York City at Eleventh avenue and Twenty-eighth street, which will cover 140,000 sq. ft. The buildings will be 80 ft. high, and there will be tracks the whole length of the row, about 700 ft. The location is favorable for the transfer of ocean freight to and from cars of the New York Central road, piers 57, 58, 59 and 60, which are used by steamships, being near by.

The "California on Wheels" exhibition, which made the agricultural and mineral products of that state familiar all over the country, has been imitated by a manufacturing concern of San Francisco, which has fitted up a car in attractive style for the purpose of taking a stereoptican exhibition around the country. The idea apparently is to give a free show in the towns where the car stops and depend for income on the advertisers who decorate the car with pictures of axle-grease, copper-riveted overalls, sewing silk, royal Dutch cocoa, Golden Gate baking powder and Leak's gloves.

The Canadian Sault Ste. Marie Canal.

The canal at Sault Ste. Marie, on the Canadian side, is ready for the masonry. It will have 18 ft. of water. The American canal has 21 ft. of water, while the new lock being constructed by the United States government is 44 ft. deep and 100 ft. wide. The Dominion government is considering the advisability of increasing the depth of the Canadian canal to 21 ft.

Economical Use of Private Wires.

Mr. P. B. Delany, of New York City, whose ingenious apparatus for adjusting the batteries of a way wire so as to obviate the inconveniences incident to poorly adjusted relays at way telegraph offices, was described in the *Railroad Gazette* of Nov. 1, 1889, has lately invented and described in the *Electrical Engineer* a machine for automatically transferring a wire, simultaneously at both ends, from one pair of subscribers to another, every five minutes, or at intervals multiples of five, during a whole hour. It will be seen that the object of this device is to permit the use of a private wire alternately by two or more different pairs of customers. For instance, three New York banking houses desiring a private line, either telegraph or telephone, to Philadelphia, can be combined and be allowed to use the common wire 20 minutes each alternately; or the time can be divided up in shorter periods. The principle of the apparatus is similar to that employed in the "line adjuster;" the wheel, with insulated sections on its periphery, with the "trailer" being an essential feature.

News from the West.

Mr. Gould and party left on the Lake Shore limited for New York at 5:30. An incident of the trip from Omaha was that Gould was shaving himself while for three minutes the special maintained the unprecedented speed of 102 miles an hour.—*Chicago Despatch.*

Of course, no one but Jay Gould could do such extraordinary shaving, and only a road terminating in the railroad centre of the universe could run a train at such a speed. It is a pity that such an annoying typographical error crept in; but, of course, every one understands that the figures should have been arranged t'other way —201.

RAILROAD GAZETTE

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EDITORIAL ANNOUNCEMENTS.

Contributions.—*Subscribers and others will materially assist us in making our news accurate and complete if they will send us early information of events which take place under their observation, such as changes in railroad officers, organizations and changes of companies in their management, particulars as to the business of the letting, progress and completion of contracts for new works or important improvements of old ones, experiments in the construction of roads and machinery and railroads, and suggestions as to its improvement. Discussions of subjects pertaining to* ALL DEPARTMENTS *of railroad business by men practically acquainted with them are especially desired. Officers will oblige us by forwarding early copies of notices of meetings, elections, appointments, and especially annual reports, some notice of all of which will be published.*

Advertisements.—*We wish it distinctly understood that we will entertain no proposition to publish anything in this journal for pay,* EXCEPT IN THE ADVERTISING COLUMNS. *We give in our editorial columns* OUR OWN *opinions, and those only, and in our news columns present only such matter as we consider interesting, and important to our readers. Those who wish to recommend their inventions, machinery, supplies, financial schemes, etc., to our readers can do so fully in our advertising columns, but it is useless to ask us to recommend them editorially, either for money or in consideration of advertising patronage.*

The all-rail freight tariff between the Atlantic Seaboard and the northwest by way of Sault Ste. Marie, on the basis of $1.07 first-class, New York to St. Paul, which was briefly announced last week, has caused a good deal of talk and much newspaper discussion, but it apparently has no more significance than similar tariffs issued in previous years (which never secured enough freight to disturb the New York-Chicago lines seriously), except to show that the New York Central, like its rival, the Pennsylvania, is inclined to be a trifle independent occasionally; just enough to show that it does not regard its obligation to love its neighbors in the Trunk Line Association as so very much greater than its duty to look out for Number One. The New York Central's control of the Rome, Watertown & Ogdensburg makes it a link in the New York-St. Paul rail line of the Canadian Pacific, and it of course can now divert this traffic from the New York, Ontario & Western, which took it last year, to its own line between New York and Rome or Syracuse. The freight is not carried over the New York Central proper, but by the West Shore, which is made to take most of the less desirable through business coming to its owner; but, nevertheless, it goes over a Central line, and so Commissioner Goddard has called a meeting of the trunk lines to investigate the issuance of the irregular tariff. The Canadian Pacific seems to be the leader, the West Shore keeping in the back ground, but the Canadian road is not a member of any association (except the Trans-continental), and it will have to be persuaded rather than coerced. The New York Central is the real offender. The Trunk Line Association had approved a low rate out of New York over the Ontario & Western and the grievance of the Erie, Pennsylvania, etc., so far as they have any, is in the transfer of this differential from a weak road to a strong one. The West Shore is allowed a differential on its direct Western tariffs (to Chicago, etc.), though not so large a one as the Ontario & Western has. But, as neither a weak road nor a strong one is likely to send enough freight by the "Soo" rail route, especially when the boat lines are running, to greatly disturb the Trunk lines there will probably be no difficulty in coming to an agreement. A more important question for the Trunk Line meeting to consider is that relative to the routing of emigrants westward from New York. It is claimed that the Lackawanna continues to secure passengers outside the joint agency at the Immigration Bureau, and the increasing number of emigrants coming from Europe makes the question quite important. It is also said that the Canadian Pacific gets enough emigrants out of New York (over the West Shore) to make the other roads somewhat uneasy.

Improvements in Locomotive Boilers.

The paper on "Improvements in Locomotive Boiler Construction," read by Mr. John Hickey at the March meeting of the Western Railway Club, was discussed at the April meeting. No more timely topic than this could have been selected in the motive power field, as there is on all sides increasing interest in boiler construction, and opinions differ widely.

Mr. Hickey presents a design of boiler which has many excellent features. (See *Railroad Gazette*, April 3.) Those who favor the Belpaire fire-box will hardly be ready to accept the radial stay wagon top as being the most improved construction, yet they will be compelled to admit that, barring the old and much discussed question of the angularity of a few of the crown stays to the sheets, there is scarcely a single fault to find with the design presented. If large steam space and heating surface, good circulation and accessibility for cleaning are desirable features of a locomotive boiler, then this design justly claims attention. Flat-stayed surfaces are reduced to a minimum, as all of the shell sheets, except the legs of the fire-box, are circular, and, therefore, as might be expected, the weight of stays in this boiler is small and all are so placed as to permit the crown sheet to be readily cleaned and scraped. The entire sides and crown of the fire-box are in one sheet, and those who have had to repair leaky joints in the upper corners of fire-boxes know the value of this construction, which is seldom used with the Belpaire, and not at all feasible when the common crown bar is used.

Whatever may be the various opinions as to the merits of this design for engines with front trucks, where a reduction of weight at the front is desirable, the fact remains that this type of boiler is receiving much attention now, and an extensive trial is being made of it on many roads where bad water has caused no end of trouble with boilers having crown bars and cross stays close to the crown sheet, and if there is that trouble with the angular stays which has been predicted, we shall soon learn of it.

The double row of mud ring rivets is practically a necessity with bad water, although not a necessity for tightness with good water. The location of the supporting tubes for the fire-brick is admirable, and with these tubes made three inches in diameter, as they are on the Wabash and the St. Paul, burning out and cracking at the sheet line have been almost entirely obviated. The shell lap, shown by Mr. Hickey, has been for years used almost exclusively by the Rhode Island Locomotive Works for all their engines, and has added much to the reputation of that firm for good boiler work. This lap is cheaper than, and the next best joint to, a butt seam with double welts. The 4 in. $\times \frac{7}{8}$ in. stiffening ring for the dome on the 63-in. shell is none too large, and many have used 5 in. $\times$ 1 in. for smaller shells than this.

On the whole, Mr. Hickey has shown us what is the prevailing tendency in locomotive boiler construction in this country. There are no untried features of construction in the design offered, and none need feel that it would be an experiment to build locomotive boilers for high pressures and bad water on the plan proposed.

The outward shape and appearance of locomotive boilers have not materially altered for years, but the details of construction have materially changed in the past decade. Higher pressures, the increased use of locomotives in sections where bad feed water is common, a demand for greater boiler power, and better rolling mill facilities, have all contributed to these changes of detail, and improved construction. In the days when a boiler sheet 6 ft. by 10 ft. was a large one and when the iron used had to be so ordered that the grain would run parallel with the line of maximum stress and at right angles to the axis of vibration of the sheets, it was no uncommon occurrence to make the outside shell of a fire-box in six independent sheets. Now the large rolls and the homogeneous material used enable very large fire-box shells to be all made of a single sheet, with a large reduction in the number of joints and cost of construction.

Wagon top boilers with flat sides, most difficult to stay properly, were common a few years since, and so long as the pressure carried was not above 120 lbs. per sq. in. there was little difficulty with 48-in. and 50-in. boilers. But the increase to 160 lbs. pressure and large boilers so magnified the movements of the shells under pressure that cracks along the horizontal seams and around the domes became frequent and explosions resulted. All this flatness had its only purpose in a gain of 5 to 6 in. in width at the cab. Now, without any apparent difficulty all these flat sides have disappeared and the shells of wagon top boilers, whether with crown bars or radial stays, are made arcs of circles; this, with the removal of the horizontal seams, has taken away nearly all trouble with cracks in the wagon top sheets.

In order to clear the wheels on eight wheelers, boilers were formerly distorted and flattened rather than to raise the centre of gravity of the engine by raising the boiler, but this, too, has undergone a radical change; boilers are now raised to clear the wheels, and to comparatively high positions sometimes. The result has been, according to the preponderance of evidence, an easier riding engine. So the fastenings of the boiler to the engine frames have been altered. It used to be considered necessary to have some sort of a brace between the shell and the frames, at least once in five or six feet of its length. Some of these fastenings were considered as "boiler braces," "boiler supports" or "boiler carries"; others considered them as "frame braces" or "yoke sheets." Sometimes they were fastened to the boiler, but often were left to slide thereon; in such cases their only office was to support the shell. This, too, has changed, and now the boiler is rightly considered as a strong tube well able to support itself, and attachments are only made to the frames when it is deemed necessary to strengthen them or the guide yokes by securing them to the boiler.

The crownbar has disappeared from marine service almost entirely, and before long the radial stay and the Belpaire fire-box will have driven it from locomotive boilers; and, while it has been a good servant in the past in supporting the crownsheet, and a necessary evil, all will be thankful when its use is no longer common, and this great obstruction to circulation, this assistant to scale formation, and cumbersome mass of dead weight, have been removed, and the equivalent in cost and weight placed in the shell to increase its diameter, the heating surface and the steam space.

Fire-door holes have been put through a course of changes that has resulted, not in a new type, but a re-return to one of the older forms. The pockets for mud formed by some of the types of fire-door joints caused no end of trouble; now the simple joint made by flanging the fire-box door sheet outward and the back head inward, with the caulking edge pointing away from the fire, is almost universal. Roundabout joints are still made with single riveting by some, but the majority of master mechanics prefer the double-riveted joint, not as a necessity to resist the longitudinal pull on the sheets of the shell, but to secure a more enduring, tight joint to strengthen the boiler on the lower side against the strains brought about by the resistance of the expansion pads on the frames and to prevent the shearing of the rivets in the seams and leaking of tubes, a result of end collisions which would not damage materially a double-riveted boiler.

Hollow stay bolts are looked upon more favorably each year, not the kind which admit air for better combustion, as they are still a matter of excited dispute, but those with small central bores which act as a "tell-tale" to indicate at once the presence of a broken bolt. Large hollow stays for improved combustion are as little understood as they are extensively tried, in a rambling sort of a way. Those who make them a success are those who know how to place them and the proper number to use. One of the late items of gossip in a certain quarter was the apparent success of a locomotive which had a square yard, more or less, of hollow stay openings into the fire-box, close down to the fire level. The wonder was how any air at all came through the grates. But the scientific fireman explained it all by saying: "When you want steam for a hill just run a thick fire and plug them holes with coal and you can make her blow every time." Air admitted above the fire is advantageous with soft coal, but evidently there can be too much of it.

One might think from the discussion of the relative merits of the deep fire-box and the shallow one that the shallow box had been adopted because there was something in its "shallowness" that was of advantage. In general this is not so; the shallow boxes would have all been made deep if it were possible to do so. What has compelled the shallow box is the absolute necessity for a larger grate area. It is not possible to burn sufficient coal on the largest grate that can be placed down between two pairs of driving wheels to generate the steam needed to drive the modern heavy locomotive without such a blast as to waste coal and give excessive back pressure in the cylinders. Hence the fire-box must be raised above the axles, and in most cases this means above the frames also. This necessitates the shallow box, and it is a lesser evil than the small grate. All designers try to get the fire-box as deep as possible, especially under the tubes, and for this reason: Boilers with fire-boxes above the frames are generally much higher from the rail than those with deep boxes between the wheels. There can hardly be any discussion as to the merits of the two fire-boxes, the shallow or the deep. The deeper the better, of course, but a

larger grate must be had, nevertheless, and as long as the fire-brick arch is used, and there is sufficient distance from the fire to the tubes and no loss of fire-box heating surface, the box above the frames carries with it sufficient incidental advantages, such as a shorter wheel base, etc., to make it, in general, for large engines preferable to the deep box; not because it is shallow, but because it gives a larger grate, better combustion and less back pressure in the cylinders.

The Law about Through Tickets.

In spite of Commissioner Morrison's opinion, there is no such thing as a common-law right to have a through ticket whenever and wherever a man wants it. The duties of common carriers, however varied, do not include that of acting as agents for every similar common carrier, whether they want to or not. The duty of the trunk lines to sell Alton tickets, if urged at all, must be urged on narrow grounds. These grounds might be of three kinds: (1) Statutory enactment; (2) obligation not to discriminate; (3) usage.

If a statute had been passed bearing on the case, and had been pronounced constitutional, the matter would be clear. In England there is such a statute, namely, the Railway and Canal Traffic Act of 1854; which, without going so far as to force a road to sell through tickets to everybody that wants them, compels it to give connecting lines reasonable facilities in this respect. Under this act the courts have assumed pretty wide powers. It is the opinion of the Interstate Commerce Commission, as expressed in the case of the Little Rock & Memphis against East Tennessee, Virginia & Georgia, that Congress meant to pass a similar law for this country: but this only brings out into clearer relief the explicit statement, in the same connection, that Congress did not do it. Of course, if there is no statute, the question of its constitutionality has not come up.

As for discrimination, neither the common law nor the Interstate Commerce Act seems to apply to the question in hand. Take a parallel case. Suppose the trunk lines thought it necessary to use a standard height of drawbar; that the Burlington was willing to have its cars conform to that standard, while the Alton insisted on its right to do as it pleased. Suppose now that a shipper complained of discrimination, because his rival was allowed to send his goods by the Burlington without transhipment and at a through rate, while he could not send goods by the Alton without the inconvenience and expense of double shipment. If he made such a complaint, and insisted that the height of drawbars was a mere detail of operation, which could not be allowed to interfere with the duty of the roads to the public, he would be laughed at. Why is not the present case a parallel one? True, the Alton officials would insist that the practice of paying commissions does not make trouble in the way that other roads assert; but the burden of proof lies upon them, and they have failed to meet it. The Interstate Commerce Commission agrees with the trunk lines that the practice is a bad and demoralizing one; and it is not discrimination against a section of the public to put it to inconvenience by refusing to act as agent for a road which engages in bad and demoralizing practices.

The question of usage presents more difficulty. If the public has become accustomed to certain business methods and facilities, it acquires a sort of well-established though ill-defined right not to have them withdrawn on trivial grounds. The action of the authorities in the matter of immigrant tickets will doubtless be guided by this idea. The question here becomes extremely delicate; for we have to determine how far the public right has become established by usage, and how far the grounds for its abrogation are really important or only trivial. On the relative force of these two considerations must depend the answer to the question whether the railroads are justified in what they are doing; and it is not strange that different people should look at the matter differently. At the same time, in any such case of doubt, if a railroad company thinks that it is liable to be involved in violations of law by acting as agent for another, the general presumption is pretty strongly in favor of allowing it to discontinue such agency.

American and English Freight Cars.

On another page will be found two letters which have decided us to say a word or two on a subject which we have been very reluctant to touch, for several reasons; that is, the crusade which Mr. M. R. Jefferds is making for the "tube-frame car," as it is called in England. We have never taken Mr. Jefferds very seriously. Perhaps we have not taken him seriously enough; perhaps C. W. K. and the Englishmen have taken him too seriously. It is well understood on this side that he is trying to sell the tubular frame car abroad, and that his anxiety about the wasteful methods of the Englishmen is "for revenue only." This may be unjust, but certainly Mr. Jefferds' business interests would be greatly served by the success of his propaganda. Therefore, we have not thought it worth while to show that he is only a *soi-disant* champion of American practice, and that really he misrepresents it. Perhaps, however, C. W. K. may be right, and it may do American interests some injury to let Mr. Jefferds go entirely uncorrected.

The first misrepresentation that one encounters in the paper of which C. W. K. speaks is in its third paragraph (page 476 of the October "Proceedings," I. M. E.). There Mr. Jefferds endeavors to give the impression that the "tube frame" cars are standard in the United States. He says, "timber sole-bars have generally been considered best, prior to the introduction of the tube frame. . . . Frames made of channel iron or steel have been . . . found too rigid. . . . With timber sole-bars the limit of elasticity is reached at loads of 20 tons."

The fact is the tubular cars in service in the United States are about six-tenths of one per cent. of the total freight equipment. They are not built or owned by the railroad companies, but by a company which leases them to the railroad companies. They are in no sense the standard of a single railroad company of the United States, but are looked upon with great distrust by many, if not by most, of the mechanical officers of our railroads. It is said that if they pass through a wreck, even a plumber cannot repair them, and there is great uncertainty as to the cost of repairs. It is but fair to say, however, that a very intelligent superintendent of motive power, who has had perhaps more experience with these iron cars than any other railroad officer in the United States says "they have been and are now giving us good service. If they get badly broken in wrecks they are more expensive than wooden cars to repair. This, however, should not be an argument against them, as on well-conducted roads the proportion of car repairs due to accidents is so small a proportion of the total car repairs that it should not be taken into account. Cars are built to run on rails and not on the ground." Aside from accidents, he does not think that they would cost as much as wooden cars to maintain. They have less dead weight than wooden cars, and are built of a more durable material. The sum of the matter is that the status of the "iron car," as it is called here, is still experimental.

The intimation that iron and steel channel frames have been tried and abandoned is gratuitous and misleading. On the contrary, that is the direction in which designers are working with the greatest probability of success. The statement about timber sills or "sole-bars" is equally misleading. Most new freight cars are designed for from 25 to 30 tons, and all have wooden sills.

On page 482 Mr. Jefferds says (1) that the average life of the chilled cast-iron wheel is 120,000 miles; (2) that its scrap value, when worn out, is 80 per cent. of its original cost; and (3) that a steel tire must be turned after it has run 22,000 miles, and that its average life is about 90,000 miles.

Now we have a great admiration and respect for the chilled cast-iron wheel. It is one of our "institutions," and is one of those products of American ingenuity which have made possible our enormous railroad development, with all the consequent gains to the whole world. But Mr. Jefferds speaks nonsense about both the cast-iron and the steel-tired wheel, which, if it has any effect at all must have a bad effect. The guarantee for the life of a cast-iron wheel in freight service, as fixed by a joint committee of the Association of Wheel Makers, the Master Car Builders and the Master Mechanics, is four years and is based on an average mileage of 50,000 miles. The guarantee for passenger service is 60,000 miles; but Mr. Jefferds is talking of freight service. We are aware that a greater mileage has been obtained in several instances, but the guarantee required by the joint specifications and guarantee, as above, is doubtless a very just one, and no one in the United States claims to have approached 120,000 miles as an average.

(2) The committee mentioned above based the guarantee recommended by it and adopted by the associations on a scrap value for old chilled wheels of 45 per cent. of the price of the new wheels, not 80 per cent.

(3) The average life of the first set of tires of 3,000 steel-tired, paper wheels, as given by Mr. G. M. Pullman to the Massachusetts Railroad Commissioners, was 340,843 miles. The average of a large number of tires on the Grand Trunk before the first turning was given some years ago as 73,566 miles. In 1888 the quality of the tires bought had deteriorated, but the average life per tire had been 162,000 miles. On the Boston & Albany in 1888 the average mileage of 720, 33-in., steel-tired wheels before the first turning amounted to 111,804 miles, and the average total mileage was 268,578 miles. We shall not stop to hunt down further records. These will show how worthless are the statements made about wheels.

It seems hardly necessary to follow Mr. Jefferds further. We find in the first eight pages of his paper at least six important errors of statement or of implication. Flowing from these errors, and others, is his argument that English railroads could carry freight as cheaply as the American railroads do if they used American cars. For instance, he says that a locomotive can haul a load of 1,000 tons on 40 "bogie" cars as easily as it can haul 256 tons on 32 ordinary English cars. Really it is not worth while to attempt to refute such a statement, and it is very questionable if American freight cars would not add to the cost of working English traffic. If the average car load is two tons there would be an obvious waste in carrying it on a car built for a load of 30 tons.

March Accidents.

Our record of train accidents in March, given in this number, includes 74 collisions, 128 derailments and 10 other accidents, a total of 212 accidents, in which 44 persons were killed and 191 injured. The detailed list printed on another page contains accounts of only the more important of these accidents. All which cause no deaths, or injuries to persons are omitted, except where the circumstances of the accident as reported make it of special interest.

These accidents are classified as follows:

COLLISIONS:	
Rear	43
Butting	18
Crossing and miscellaneous	13
	— 74
DERAILMENTS:	
Broken rail	12
Loose or spread rail	10
Broken bridge	5
Defective switch	6
Defective joint	1
Broken wheel	5
Broken axle	6
Broken truck	2
Fallen brakebeam	2
Defective throttle	1
Broken drawbar	1
Misplaced switch	9
Track repairers	2
Tree felled by lineman	1
Bad loading	1
Cattle on track	2
Snow or ice	3
Landslide	3
Malicious obstruction	4
Accidental obstruction	2
Purposely misplaced switch	2
Unexplained	48
	128
OTHER ACCIDENTS:	
Boiler explosion	1
Cylinder explosion	1
Broken parallel road	1
Cars burned while running	4
Various breakages of rolling stock	2
Other causes	1
	— 10
Total number of accidents	212

The causes of collisions, where given, were as follows:

	Rear.	Butting.	Crossing and other.	Tot'l.
Trains breaking in two	5	..	..	5
Misplaced switch	2	1	..	3
Failure to give or observe signal	1	..	1	2
Mistake in giving or understanding orders	..	5	..	5
Miscellaneous	12	3	7	22
Unexplained	23	9	5	37
Total	43	18	13	74

A general classification shows:

	Collisions.	Derailments.	Other Accdts.	Total.	P.c.
Defects of road	..	34	..	34	16
Defects of equipment	5	17	5	27	13
Negligence in operating	31	13	4	48	22
Unforeseen obstructions	1	16	1	18	9
Unexplained	37	48	..	85	40
Total	74	128	10	212	100

The number of trains involved is as follows:

	Collisions.	Derailments.	Other Accdts.	Total.
Passenger	23	50	8	81
Freight and other	112	81	2	195
Total	135	131	10	276

The casualties may be divided as follows:

KILLED.	Collisions.	Derailments.	Other Accidents.	Total.
Employés	14	21	..	35
Passengers	2	4	..	6
Others	..	3	..	3
Total	16	28	..	44
INJURED.				
Employés	48	48	..	96
Passengers	12	77	1	90
Others	5	..	..	5
Total	65	125	1	191

The casualties to passengers and employés, when divided according to classes of causes, appear as follows:

	Pass. killed.	Pass. injured.	Emp. killed.	Emp. injured.
Defects of road	2	36	4	23
Defects of equipment	1	10	3	7
Negligence in operating	3	12	16	50
Unforeseen obstructions and maliciousness	..	1	2	4
Unexplained	..	31	10	12
Total	6	90	35	93

Thirty-three accidents caused the death of one or more persons each, and 48 caused injury but not death, leav-

ing 131 (62 per cent. of the whole) which caused no personal injury worthy of record.

The comparison with March of the previous four years shows:

	1891.	1890.	1889.	1888.	1887.
Rear collisions	43	38	26	36	20
Butting "	18	17	11	26	22
Crossing and other collisions	13	12	1	3	3
Derailments	128	93	59	99	59
Other accidents	10	11	4	8	13
Total "	212	171	101	172	117
Employés killed	35	35	19	53	32
Others "	9	9	3	32	27
Employés injured	96	95	54	103	68
Others "	95	70	50	108	144
Passenger trains involved	81	49	33	75	46
Average per day:					
Accidents	6.84	5.52	3.26	5.55	3.77
Killed	1.42	1.42	0.71	2.74	1.90
Injured	6.16	5.32	3.35	6.79	6.84
Average per accident:					
Killed	0.209	0.257	0.217	0.500	0.594
Injured	0.901	0.965	1.029	0.227	1.812

The most notable accident of the month was the derailment near Havana, Ill., on the 8th. The engineer of the state railroad commissioners made an investigation of this accident, but we have not yet seen any report of his conclusions. The locomotive of the derailed train was not excessively heavy, its weight being about 45 tons, and the speed of the train is said to have been only 30 miles an hour, but the rails at this point had been in use about 13 years, and had become worn so that they weighed only about 52 lbs. per yd. It appears that a length of about two miles at this point was the only piece of track on the whole road which had not been lately renewed with heavier rails. A trackwalker was specially employed for this section, but the value of a watchman, so far as finding broken rails is concerned, would, of course, be greatly lessened by the very unfavorable conditions of weather at the time that this derailment occurred.

The other accidents in which passengers were killed were the derailments at Greencastle, Mo., on the 17th, and Anchorage, Ky., on the 23d, and the collision at Carbon, Ia., on the 1st. One of the most exciting accidents of the month was the derailment of a fast train near Devon, Pa., on the 29th, where the escape of the passengers from serious injury was very remarkable. Most or all the cars of this train were vestibuled. A rude cut printed in a Philadelphia paper would seem to indicate that the cars were turned upon their sides practically all at once, as though they were a single car. The immediate cause of the butting collision at Racine Junction, Wis., on the 25th appears to have been poor judgment in trying to handle a freight train of 64 cars with an insufficient crew or insufficient brake power; but it is stated in the reports that the passenger train would not have been where it was, and would not have been struck by the freight train, if the runner of it had made the proper stop for a grade crossing near by.

A passenger train on the Ensley City "dummy" line was derailed near Birmingham, Ala., on the 29th, killing a passenger and the engineer. "Dummy lines" are not classed as railroads by the Alabama Commissioners, and this accident is therefore omitted from our list. A street car was struck by a freight train in Philadelphia on the 5th, and eight passengers were badly shaken up. A cable car was struck by an engine in the same city on the 10th, and one passenger injured. In Chicago, on the 28th, a State street cable car was struck and badly damaged by a Baltimore & Ohio switching engine and 15 or 20 passengers tossed about, but no fatal injuries are reported.

On the 23d, near Springfield, O., a freight train was flagged in consequence of the unexpected stoppage of a passenger train. The engineer and fireman thought that the flag was to give notice of a washout, and they jumped from the engine and were fatally injured. At Bufords, Tenn., on the 4th, an engineer in reversing his engine hastily [on, suddenly encountering a red light, was knocked out of the cab by the reversing lever and badly injured. The fireman, seeing the danger signal ahead and becoming confused, jumped off and allowed the train to run uncontrolled. Near Tamaqua, Pa., on the 15th, two brakemen on a freight train fell through the bottom of a coal car, in consequence of the giving way of the drop bottom on which they stood. One of them was killed, but the other kept hold of the car body and came out alive. Near New Brunswick, N. J., on the 17th, a runaway horse dashed against a rapidly moving passenger train with such force as to badly damage a car and necessitate its being set out. An engineman of the Manhattan (elevated) caused a small panic, by running a train around the sharp curve at Fifty-third street and Ninth avenue so rapidly as to throw the passengers against the windows. Several panes of glass were broken.

The interest now due on the bonds of the Poughkeepsie Bridge is in default. A plan has been put forth to fund the coupons for several years, and more than a majority of the bondholders have assented to it. The argument in favor of funding is that, although the traffic of the bridge across the Hudson at Poughkeepsie is not yet heavy enough to earn operating expenses and fixed charges, yet it is increasing, with a prospect of reaching the necessary amount within three years or so. The parties who own the bridge own also the Central New England & Western, a railroad running from the bridge to Campbell Hall on the west bank and to Silvernails on the east, at the latter junction connecting with the Hartford & Connecticut Western, which it leases. At Campbell Hall connection is made with the Erie, the Ontario & Western, and with the Lehigh & Hudson River, the latter road now owned by the Central of New Jersey. Of course, the main traffic of this system is coal, though the expected tonnage has not been carried. The Erie is not favorable, partly because of the Lehigh & Hudson River and the Pennsylvania, Poughkeepsie & Boston, whose lines reach by a detour to the southward the same coal fields as the Erie by its branches. This last named road (P., P. & B.) is in a receiver's hands. It runs to a connection with the Lehigh Valley near the Delaware River, and is partly completed toward Harrisburg. None of the crossing coal roads have been induced to take an interest in it, and its owners appear to have given up hope in it, at least for the present. The bridge system, substantially controlled by the same set of men, has not realized anticipations. The Central New England & Western did not earn fixed charges last year. The prospects and probable outcome of the whole enterprise were set forth in some detail in the *Railroad Gazette* of February 21, 1890, and the judgment then expressed is confirmed by the facts above outlined. The Erie continues to ferry its coal across the Hudson at Newburg to the New York & New England, with which road the bridge system has no connection. The bridge coal traffic comes mostly from the Central of New Jersey, via its owned line, the Lehigh & Hudson River, and goes mostly to such northern New England points as can be reached by the Hartford & Connecticut Western and the Boston & Maine in competition with the coal carried by other roads from Sound or ocean ports. In spite of the failure of the Poughkeepsie Bridge to earn fixed charges, other bridges are still talked of to cross the Hudson River in its vicinity, and one of these companies has spent several hundred thousand dollars in preliminary work. Naturally enough, nothing is now being done on these other bridges.

The Denver & Rio Grande has just issued a new schedule of wages for trainmen, in pursuance of an agreement entered into with the men several weeks ago which is notable by reason of a clause providing that "as a rule the maximum pay in any one month shall not exceed $150 for conductors and $100 for brakemen, for the reason that the mileage and hours necessary to exceed these amounts would render the efficiency of the men and the safety of life and property doubtful." Trainmen are expected to give timely notice when they need rest. The accounts printed in the newspapers do not clearly state the rates, but the increase of pay established by the new schedule is said to average 15 per cent. It appears that most of the train work is paid for by the run, and the old principle of paying a lump sum by the month seems to have still some influence in making rates, more so than is generally the case on eastern roads. For miscellaneous work such as work trains, extra freights, etc., conductors are to receive $3.85 per 100 miles and brakemen $2.90. If a 100 mile run takes more than 10 hours, overtime is to be allowed at the rate of 35 cents per hour for conductors and 25 cents for brakemen, less than 30 minutes not to be counted. Extra passenger conductors will receive $115 per month, and extra passenger brakemen $75. Train porters will be paid 70 per cent. of brakemen's wages. The establishment of a monthly maximum may not be a very effectual check on the tendency of men, when freight traffic is heavy, to work more hours than they ought to; but it is a move in the right direction. Train masters and despatchers are often tempted to encourage overwork, and only very good discipline, looked after directly by the superintendent, will prevent it; but anything which makes it for the interest of the men to rest ought to aid good discipline. The ideal would be a daily instead of a monthly maximum; but no one feels able to afford such an expensive luxury. Even a weekly limit to the number of trips a man might make would often be hard to enforce, but it is perhaps the most natural and convenient division of the time, and would be worth trying. A month is so long that a rush of work in the first half might place a large number of men in a position to desire vacations all at once in the last week, unless the money limit were set too high; and if it be too high it is of no value any way.

The aggregate capacity of the furnaces in blast in the United States on the first of this month was 113,316 tons. This makes the probable output for the first quarter of this year 1,706,575 gross tons as against 2,284,949 during the same period of last year. In fact, it is nearly as small as the output for the same time in 1888, 1,602,961 tons. Judging of the state of affairs by the number of furnaces in blast, it is even worse in England, for on March 31 there were only 174 furnaces in blast in Scotland, the Cleveland, West Cumberland and North Lancashire districts—as against 244 a year ago, and 230 at the same date in 1888. Comparing the British exports for the first quarters of the two years, there has been in pig iron a decrease of 42.1 per cent. in quantity and 54.3 per cent. in value, while the total exports of iron and steel have decreased 23.2 per cent. in quantity, and 13.2 per cent. in value. The only item in which there has been an increase of any amount for the quarter is tin plates; the quantity of these exported for the quarter has increased by 37,213 tons; the increased export to this country was 30,667. The total value has increased by £707,267, and the increase credited to this country was £726,673. The increase in quantity exported to this country was at the rate of 66.8 per cent, and in value at the rate of 80.3 per cent. So that if it were not for our tin plate trade the English showing would be much worse than it is; the decrease in values would be 23 instead 13.2 per cent. There seems no chance for a revival of the iron trade until preparations are made to move our wheat crop. There is no reason to doubt a very active demand for our wheat, as reserve stocks all over the world are greatly reduced, and railroad companies cannot, with prudence delay ordering new cars much longer.

General Passenger Agent Taylor, of the Richmond & Danville, has issued, for the benefit of his passenger conductors and their men, a circular containing the charge to the jury delivered by a South Carolina judge in a case where a passenger sued for damages for being ejected from a train for non-payment of fare. The learned judge is somewhat given to verbosity, but the rules and regulations for trainmen are in most cases so terse that a diluted version of them is in many respects a good thing, and we are glad to see Mr. Taylor's circular. The substance of the charge is an amplification of the law that a conductor is a conservator of the peace, with the powers pertaining to such an office, and that he must be a man of discretion, firmness and moral and physical courage, one who can inspire the passengers with a feeling of security and respect; that a passenger must pay the lawful fare [higher than the ticket rate], and that he becomes liable to ejection when he threatens to stay on the cars in spite of his refusal to pay. Further, the judge justifies the conductor in putting the man off between stations; although the rules say that passengers must be ejected at stations, a contumacious person who intends to travel only from one station to the next, and who thus might constantly defraud the railroad, may be reasonably put off at any place if the place be not dangerous or unhealthful or otherwise of such a character as to make the ejection inhuman.

It has become so common to ride cheaper by a long than a short route that it sounds decidedly odd to read that the roads interested in the shortest route from the Missouri River to the Pacific Coast are demanding a differential because passengers show such a preference for the longer lines. People who believe in uniform mileage rates for all passengers, and those who think cost of service should be the first and main factor in fixing prices for transportation, can now cheer up. If the Southern routes to California raise their rates the anomalous condition of things, in which the more miles we travel to reach a certain place the less money we pay, will be partially straightened out, in one section of the country at least. But the fact is, unfortunately, that the real reason that people go the roundabout way is not a desire to get the most miles for their money, but simply that they have better chances for sightseeing or more agreable climate; so the satisfaction of the theorists can be only short-lived. For once the shortest route does not seem to be in all respects the best.

We are sorry to hear that another testing department is to be given up for the sake of economy. This time it is the Union Pacific, which adopts about the most extravagant economy that we know of, and will abolish its department of tests the 1st of June.

NEW PUBLICATIONS.

Annual Statistical Report of the American Iron and Steel Association, containing complete Statistics of the American Iron Trade for 1890 and preceding years, and a brief Review of its Present Condition. Also the latest Statistics of the Iron Industry of Foreign Countries. 8 vo. pamphlet, 80 pages. Philadelphia: The American Iron and Steel Association, No. 261 South Fourth street. 1891.

Mr. Swank is out about two weeks earlier than usual with his report, and when we consider that his statistics are collected from so large an area, this prompt compilation and issue is a triumph, particularly in view of the fact that Mr. Jeans has not yet ascertained even the make of pig iron in Great Britain.

Every one knows that 1890 was not only our year of greatest production, but was also the first year in which we distanced all competitors in the quantity produced. Mr. Swank's figures for the production of the past three years are as below, in gross tons of 2,240 lbs., except nails, which are in kegs of 100 lbs.

	1888.	1889.	1890.
Pig iron, including spiegel	6,489,738	7,603,642	9,202,703
Spiegeleisen	48,901	76,626	133,189
Bessemer steel ingots	2,511,161	2,930,204	3,688,871
Bessemer steel rails	1,386,278	1,510,057	1,867,837
Open-hearth steel ingots	314,318	374,543	513,232
Open-hearth steel rails	4,696	2,987	3,587
Crucible steel ingots	70,297	75,865	71,175
Rolled iron, except rails	1,073,111	1,414,621	1,633,256
Iron rails	12,725	9,159	13,914
Pig, scrap and ore blooms	35,603	32,375	27,485
Kegs of iron cut nails	2,170,107	1,778,082	1,806,130
Kegs of steel cut nails	4,323,484	4,032,676	3,834,816
Kegs of wire nails	1,500,000	2,435,000	3,135,911
Iron and steel wire rods	279,769	363,851	457,099

In addition to the above, 3,793 gross tons of "miscellaneous," including "patented" steel, was made, bringing the aggregate production of steels for 1890 up to 4,275,071 gross tons. The increase of pig-iron production over 1889 was 21 per cent. The increase of Bessemer steel was nearly 26 per cent., and the increase in open

hearth steel was 37 per cent. Of the Bessemer steel, 50.6 per cent. was rolled into rails, as against 51.5 per cent. in 1889 and 71.6 per cent. in 1887.

Mr. Swank gives our approximate consumption of pig iron for the last four years as below:

Pig iron, gross tons:	1887.	1888.	1889.	1890.
Domestic production	6,417,148	6,489,738	7,603,642	9,202,703
Imported	467,522	197,237	148,759	134,955
Stocks on hand Jan. 1	225,629	301,913	300,144	283,879
Total supply	7,110,299	6,988,888	8,052,545	9,621,537
Deduct stocks Dec. 31	301,913	300,144	247,679	608,921
Also stocks in warrant yards	.....	.....	36,200	52,937
Approximate consumption	6,808,386	6,688,744	7,768,666	8,959,679

This consumption which was more than four times as large as in any of the years 1875, '76 or '77, was at the rate of a trifle over 321 pounds per capita.

The foreign values of our imports of iron, steel and manufactures thereof are shown for 20 years. The aggregate is $901,473,833. The average per year for the first fifth of this period was $57,785,451, and for the last fifth the average value was $46,325,030. The total value of our exports of like products for the same time was $353,504,483, in addition to which is our export of agricultural implements, and the average annual value for the first fifth of this period was $14,566,727, and for the last fifth it was $21,631,840, or for the first period, 1871-74, the value of our exports was about one fourth the value of our imports, and during the last period, 1887-90, their value was nearly one-half. The foreign value of the tin plates imported during the last 20 years was $307,341,404, or 34 per cent. of our imports of iron and steel and the manufactures thereof. Mr. Swank thinks that hereafter we shall make our own tin plate, and devotes about three pages to giving reasons for that view.

In review of Mr. Swank's report for 1887, the *Railroad Gazette*, after showing that our production of pig iron had increased from 14.7 and 15.7 per cent. of the joint production of this country and Great Britain during the three years 1861 and 1863, to 46.3 per cent. in 1887, said "Our increase in positive and relative production seems to have been accompanied by a marked decrease in the fluctuations in prices, destroying to a great extent the speculative features of the market." In 1872, when our production was only 27.1 per cent. of the joint make of the two countries, the range of prices was from $37 to $53.88 per ton, and in 1880, when we made 33.2 per cent., the prices ranged from $23 to $40. If the generally accepted estimate of the British production in 1890, 8,000,000 tons, is approximately correct, our production was 53.5 per cent. of the total make of the two countries, and the tendency to steadiness in price referred to three years ago is emphasized as the range in prices for No. 1 anthracite from January, 1890, to April 15, 1891, was between $19.00 and $17.50, and for 1889 the extremes were $17 and $19.90, the higher price having been for January, 1890.

In Great Britain the course of prices was very different. Scotch warrants for G. M. B. iron were 42s. at the commencement of 1889 and fell to 40s. 10d. in February and reached 66s. 3d. on Jan. 6, 1890, and on April 14, this year, they were 42s. 11d. (the lowest price of Scotch warrants having been 37s. 1d.), so that our large production did not have the effect of steadying the market on the other side.

Mr. Swank calls attention to the fact, which, he says, is anomalous in economic history, that prices in this country declined concurrently with an increasing demand. A theory has been proposed based largely on investigations made by Gregory King, that the price of a commodity varies inversely as the square of the supply, provided the supply is not unusually small, and that no other commodity can easily be substituted. According to this theory, when the production exceeds the demand, as it did last year, the price should fall. All speculative trading in commodities is based on a knowledge of this theory, even by those who cannot state it and the old laws against "forestalling" and "engrossing" were also based on a perception of the same theory, although no one undertook to demonstrate it until about the time of William and Mary, after which the laws fell into desuetude.

The year has been emphasized by the production of the first basic steel in the South, where it promises to be a prosperous and productive industry, and by a marked increase in iron shipbuilding for private owners as well as for the government. The iron and steel tonnage launched for our commercial marine increased from 14,908 gross tons in 1886 to 53,513 tons in 1889 and 80,378 tons last year, all years being fiscal years ending with June 30.

The report acknowledges to have received from the publishers of Poor's "Manual" the statement that the mileage of railroad constructed in 1890 was 6,344 miles, 588 more miles than were constructed in 1889, but it does not credit the *Railroad Gazette* with the statement of the number of locomotives built which is taken from our issue of Jan. 2.

Proceedings of the Eighth Annual Convention of the Roadmasters' Association of America, held at Detroit, September, 1890.

Although this convention was, as usual, quite carefully reported in our columns at the time, it may be well to state briefly the more important matters contained in the report now published. The first of the committee reports is that on Nut Locks, Track Bolts and Spikes. Another one is that on Track Joints. This latter committee recommended for trial five joints, the Weber, the Long Truss, the McConway & Torley Continuous, the Clark Fisher and the Cloud.

The report which was most fully discussed was that of the committee on the Best Method of Instructing Section Laborers. This called out considerable interesting personal experience, much of which, we are sorry to see, has been expurgated from the printed report.

A committee reported on Interlocking Devices, and the report is accompanied by cuts and explanations of several of the better known machines.

A very good report was made by Mr. Reed for the committee on the Best Method of Preserving Cross Ties.

Minneapolis is announced as the place for the next annual convention, which will convene Sept. 10, 1891.

TRADE CATALOGUES.

Illustrated Catalogue of the Schenectady Locomotive Works, Schenectady, N. Y.—The Schenectady works have issued a very handsome and very convenient catalogue. The size and form are such that it can be handily carried, and the information is well arranged. The annual capacity of these works has now reached 400 locomotives, and the production in the year 1890 was 337.

This catalogue contains a few pages of interesting introductory matter, general specifications and numerous designs of a great variety of engines, giving dimensions, weights and hauling capacity on grades of from 10 to 150 ft. per mile. We quote some portions of the introduction which are especially interesting.

Regarding compound locomotives it is said:

"The question of compound locomotives coming into prominence at home and abroad, we have carefully investigated the subject, and during the past year have completed six, and forwarded cylinders for a seventh locomotive of the two-cylinder compound type. While time alone will demonstrate fully the true economy of this type of locomotive, the results thus far obtained warrant us in saying that the economy found will be from 15 to 30 per cent. over simple engines of similar design, according to the varying conditions of traffic. We unhesitatingly recommend for compound service the two-cylinder type as being the simplest and most economical design yet produced."

This company is decidedly in favor of shallow fireboxes for both bituminous and anthracite coal, and during the past year 42 per cent. of these engines have been built with shallow fireboxes.

"After our experience with the wide shallow firebox, extended over frames at sides and lengthened back over driving axle, we can unhesitatingly recommend this design as having decided advantages over the deep firebox between frames. The increased grate surface allows the burning of a slow fire, with more effective combustion and slower speed of the fuel gases. As a consequence fewer cinders are drawn through the tubes and thus a more economical use of the fuel is obtained. Since, in this style, the firebox is above the frames the wheel base can be greatly reduced—a method of construction which decreases the length of parallel rods and lessens the friction of engine on curves. The wide firebox also permits the use of a lower grade of coal. Wherever slack coal can be obtained cheaply it can be used successfully; and on coal roads the refuse screenings from mines is all that is required."

The remarks regarding iron tender frames will be approved by those who have had experience with them.

"Much opposition to the use of iron tender frames and trucks has been raised, principally because the work, having often been made light, and merely riveted together, would not stand the constant strain and jar which loosened the rivets and caused no end of trouble. Our tender frames, however, are substantially built of heavy angle iron, strongly braced with castings, bolted with turned bolts through reamed holes, and will stand the most severe strains due to pushing on the corners with pushpoles. The trucks are entirely of iron, and are of the floating bolster type. Both trucks have centre bearings, and additional side bearings are placed on the rear truck. The body of the truck is made of 12-in. channel iron, while the bolster is formed by uniting 8-in. channels by plates at top and bottom."

Catalogue No. 14 of Railway Equipment. A. S. Males & Co., Ætna Building, Cincinnati, O.

This is a small pamphlet of 28 pages, containing lists of material offered for sale. The material includes 52 standard-gauge locomotives, a considerable amount of standard-gauge rolling stock, turntables, bridges, steam shovels, etc. It also includes narrow-gauge locomotives and cars.

Temporary Catalogue of the Boyden Brake Co., Baltimore, Md. Fourth edition. March, 1891.

This is a pamphlet of 38 pages giving illustrations, very brief descriptions and price lists of the Boyden air brake equipment, which is said to be in use on 50 railroads.

Illustrated Catalogue of Special Tools for Railway Repair Shops, etc., etc. Pedrick & Ayer, Philadelphia. 1891.

So many of the excellent and ingenious tools made by this house have been illustrated in the *Railroad Gazette* that it is not necessary to do more than call attention to the fact that this new catalogue has been issued. A novel use is shown of the apparatus for heating tires, which we have before now described. It is said to have proved itself to be a valuable and economical appliance for repair shops, where a quick and cheap heat is needed to straighten boiler sheets, crown sheets, etc. Another novelty shown is a portable drilling outfit driven by an electric motor. The motor is 5 horse power, and the rope driving device consists of a multiple arrangement of sheaves. The whole is mounted on a low truck, so that it can be easily moved, and at each setting the drill can be operated within a radius of 60 ft.

Tobin Bronze. By the Ansonia Brass & Copper Co., New York.

This company furnishes Tobin bronze metal in the following forms: Ship sheathing and fastenings, pump rods and yacht shafting, sheets and plates for pump linings, condenser heads, tube sheets, etc., round, square and hexagon bars. The little pamphlet under notice gives particulars of the physical properties of this metal, results of tests and indorsements of users.

THE SCRAP HEAP.

Notes.

The Baltimore & Ohio is about to adopt the watch inspection system.

At the Mount Clare shops of the Baltimore & Ohio it has been decided to pay all foremen by an annual salary, with no overtime.

The French Government has issued a decree providing that engineers and stokers on French railroads must not be actively employed for more than 12 hours a day.

In a great fire at Chattanooga, Tenn., Wednesday, the East Tennessee, Virginia & Georgia lost a freight house and contents ($50,000) and 75 freight cars, 50 of them loaded.

Twenty-six passengers in a Raymond excursion party found that their trunks had been robbed, on arrival at St. Paul from Tacoma last week. The trunks were all in one car.

The Canadian Pacific is having built in England an exhibition car, to travel over the railroads of Great Britain and show the agricultural and other products of the Canadian Northwest.

About 300 freight brakemen on the Union Pacific struck at Trinidad, Col., last week. After lying idle four days they went to work, pending an adjustment with General Manager Clark.

It is stated that the American Express Co. has notified a large number of its employés that their pay will on May 1 be raised about 10 per cent. This restores the rates, from which 10 per cent. was taken off several months ago.

A new station is to be erected by the Illinois Central at Memphis, Tenn. It will have a frontage of 75½ ft. on Calhoun street and a depth of 202 ft. on Main street. It will be a two-story building, the front to be built of pressed brick with Alabama limestone trimmings.

The line of the Mexican Interoceanic road having been completed between the City of Mexico and Vera Cruz, the old (Mexican) road has direct competition for the first time, and faster time and reduced rates are now being given.

Nearly all of the employés of the Michigan Car Works at Detroit, about 2,500 in number, struck last week for nine hours' work at the same daily pay. The company at once announced that the shops would be closed for an indefinite time.

The Ohio Legislature seems inclined to take up the entire subject of railroad regulation. The Senate last week passed a bill compelling railroad companies to transmit messages for passengers in case of accidents on tender of the proper amount in payment.

The Minnesota Legislature, lately adjourned, passed a law requiring all regular passenger trains to stop at county seats. The Governor has refused to sign the bill requiring railroads to permit any and all applicants to build public grain houses or elevators on the premises of the roads at way stations.

The passenger department of the Pennsylvania lines west of Pittsburgh furnishes the newspapers with "copy" for its time table advertisements in the shape of stereotyped plates instead of printed slips. It is said that the inaccuracies found in many of the smaller papers were the cause of much annoyance.

The trainmen on the Sandusky Division of the Cleveland, Cincinnati, Chicago & St. Louis (late the Cincinnati, Sandusky & Cleveland), have had their pay raised so as to bring it more nearly on a par with that of the men on the main line of the "Big Four." Passenger conductors are advanced from $90 to $105 per month, and passenger brakemen from $50 to $55.

The captain of a schooner in the Hackensack River was arrested last week for hindering trains of the Delaware, Lackawanna & Western nearly two hours at a drawbridge near Jersey City by failing to get his vessel through the draw. It is said that the captain refused the assistance of tugs, and it seems to be thought that the detention of the trains, on which were many hundred passengers, was malicious.

The Texas law requiring separate accommodations for white and black passengers goes into effect June 15, and representatives of the principal roads in the state met in Galveston last week to consider plans for complying with the new regulation. It it said that most of them will use a movable partition to divide an ordinary car into two compartments, and Mr. W. P. Siddons, Master Mechanic of the International & Great Northern, presented a design for such a partition.

LOCOMOTIVE BUILDING.

Bids for building the 20 locomotives for the Cleveland, Cincinnati, Chicago & St. Louis were submitted by the Rogers, the Pittsburgh, the Brooks, the Rhode Island, the Schenectady and the Baldwin Locomotive Works. The contracts have not yet been awarded.

Another locomotive for the Grand Trunk, the third of a contract for 10 six-wheel mogul engines, left the Kingston Locomotive Works last week. The cylinders are 18 × 26 ft. One engine a week has been turned out of the works lately, but the others to be built will not be pushed along so rapidly.

BRIDGE BUILDING.

Bayonne, N. J.—The Central of New Jersey has agreed to build two new bridges at Avenue D and at Linnett street, in Bayonne, and to make important changes in the location of its present bridges.

Belmont County, Ohio.—The Legislature of Ohio has passed a bill authorizing the County Commissioners of Belmont County to borrow $50,000 on bonds for the purpose of erecting highway bridges in place of those washed

away by the recent floods in the small streams of that county.

Berryville, Va.—A combination railroad and highway bridge across the James River at this point has just been completed.

Bryson City, N. C.—The Groton Bridge Co., of Groton, N. Y., has received the contract at $8,000 for the iron work of the bridge to be built by the County Commissioners at Bryson.

Cabell County, W. Va.—The County Commissioners have contracted for a new steel county highway bridge over Four Pole River about 500 yards above its mouth. The bridge will be 260 ft. in length, with a 40 ft. roadway. Work will be commenced May 15.

Charleston, W. Va.—The Charleston & Southside bridge built across the Kanawha River to connect the city of Charleston with the East End and other towns on the south, was formally opened last Thursday. The structure is built entirely of steel, and was constructed by the Keystone Bridge Co., of Pittsburgh.

Flint, Mich.—The bridge committee of Flint will probably soon order the erection of a bridge across the Thread mill-race.

Keyport, N. J.—A new iron bridge with a 50 ft. draw is to be erected over Matawan Creek, at Brown's Point, in place of the present wooden structure. It is proposed to put up a bridge 270 ft long and 18 ft. wide. The structure is estimated to cost $12,000.

Memphis, Tenn.—The Columbus Bridge Co., of Columbus, O., has received the contract to construct two bridges, one over Loosa Hatchie River, near Memphis, at $5,359, the other on Livermore avenue, in the suburbs of Memphis, at $1,535.

Milwaukee, Wis.—Hamilton Townsend, Receiver of the Milwaukee Bridge & Iron Co., has filed a statement showing the liabilities to be $254,214 and the assets of the company $287,046.

Natchez, Miss.—Four new iron bridges are to be erected on the Natchez & Jackson division of the Louisville, New Orleans & Texas this summer, when the line is made standard gauge, to replace the present narrow gauge bridges.

Newport, Ky.—The Bellevue & Dayton Improvement Association, which was recently organized by G. R. Harms, Charles Barns and others, to develop lands at Bellevue near Newport, proposes to build an iron viaduct across Taylor's Creek.

Ninety-Six, S. C.—The new bridge to be built across Wilson's creek on the Watts Ferry road, was recently let by the County Commissioner to John Allen, of Donalds. The bridge will be 370 ft. long and 18 ft. above low water.

Parkersburgh, W. Va.—The Parkersburgh Bridge Co., organized to construct a toll bridge across the Little Kanawha River at Parkersburgh, was chartered last Thursday with a capital stock of $500,000. The incorporators are J. H. Fischer, T. F. Woodyard, S. F. Goff, J. S. Camden and Wm. Bentley. The company proposes to build a bridge from the foot of Julian street across the Little Kanawha River to the Southside.

Prattville, Ala.—An iron wagon bridge 110 ft. long and 18 ft. wide will probably be built in Prattville by the town authorities.

Ravenswood, W. Va.—The County Court of Jackson County will ask for bids in a few weeks for the erection of a new highway bridge over the Poca River, near Ravenswood. The bridge will be about 300 ft. in length and will have a 40 ft. roadway.

Roanoke, Va.—The Roanoke Development Co., has let the contract to the Pittsburgh Bridge Co., for the construction of another bridge, 1,144 ft. long, over the Roanoke River.

Ronceverte, W. Va.—A highway bridge will be built by the town of Ronceverte across the Gauley River at that point.

Stoneham, Mass.—The Boston & Maine is to construct a new road from Stoneham, on which there will be four overhead bridges, at Washington street, Ravine road, Wyoming avenue, and Franklin street.

Topeka, Kan.—Bids will be received by the Shawnee County Clerk, at Topeka, until June 1, for building the following bridges according to the plans and specifications now on file in the office of the County Clerk: A combination bridge, 50 ft. span, on oak pile substructure, on north line of section 14, township 12, range 16, in Topeka township; a combination bridge, 70 ft. span, on oak pile substructure, on Rowle's road, two miles west of Auburn; a combination bridge, 80 ft. span, on oak pile substructure, over Little Soldier Creek, in Soldier township. Bidders are invited to submit plans and specifications.

Vicksburg, Miss.—The clerk will receive sealed proposals until May 4 for building iron and wooden bridges. Plans and specifications have been prepared.

Wheeling, W. Va.—Paige, Carey & Co. are building a new abutment at the north end of the Market street bridge at Wheeling. The new abutment is to be so constructed that the old bridge can be removed without building new foundations for a new bridge that is to be the full width of the street, and which it is proposed to put in place this summer.

Plans have been prepared for a new bridge about 200 ft. in length, to be erected near Wheeling on the Pittsburgh division of the Baltimore & Ohio.

RAILROAD LAW—NOTES OF DECISIONS.

Carriage of Goods and Injuries to Property.

In Alabama it is held that where a bill of lading, containing a clause limiting the liability of each connecting road to loss or injury suffered while the goods are on its line, is accepted by the shipper, there is a legitimate limitation of liability, which is binding on each of the contracting parties, even though the shipper was unable to read, and did not know that the limiting clause was in the bill of lading.[1]

In Kansas it is held that where a railroad company, by its employés, in burning its right of way, negligently allows the fire to escape upon the premises of the adjacent land-owner, where it consumes the property of the latter, the injury thus inflicted is within the statute, as the result of a fire caused by the operation of said railroad.[2]

In Virginia it is held by the Court of Appeals that a railroad under the power given in its charter to "enter upon any convenient lands, and to cut, quarry, and take and carry away therefrom any wood, stone, gravel, or earth which might be deemed necessary," etc., it being provided that for all incidental injuries to inclosures, crops, etc., compensation shall be made, to be ascertained by commissioners, in case the parties cannot agree, has no power to condemn land, or ascertain the compensation for material before it is taken.[3]

In New York in an action by one who purchases property abutting on a street, after the erection thereon of an elevated railroad, for damages to the property caused by the road, a recovery was properly allowed for the loss of rental value during the time covered by an unexpired lease outstanding when plaintiff purchased the property, the lease having been made after the building of the road.[4]

In Indiana the Supreme Court holds that under the statute which provides that, where the title to any railroad right of way shall fail, or has not been acquired, the company or the landowner may apply for a writ for the assessment of damages, the landowner is not barred from his right to such writ by the fact that he voluntarily permitted the railroad company to enter upon and appropriate his land.[5]

In New York it is held that in an action for damages to abutting property, caused by the construction and operation of an elevated railroad, it is not error to prove the effects of the railroad on the street as manifested by a storm which happened after the commencement of the action, the fact proven not being a basis of recovery, but merely evidence in support of the injury done to the street by defendant's structure.[6]

In Alabama, the Supreme Court rules that where a train is brought under control to avoid striking cattle which run down the railroad embankment, and, on the train being started up, one of them suddenly runs up the embankment and on the track, so near to the engine that a collision cannot be prevented, and is killed in trying to cross, the company is not liable.[7]

In Mississippi it is laid down that a horse, having been run down by a train, or driven by it upon a bridge, and thereby injured, the railroad company is liable if the train had been running the limits of a city at a speed forbidden by statute, and the failure to stop in time was due to such excess of speed.[8]

Injuries to Passengers, Employes and Strangers.

In Alabama the plaintiff applied to defendant's ticket agent for a ticket to go on the limited train to a certain point. The ticket was refused because the limited train did not stop at that point. Plaintiff then applied to the conductor, who told her to get on the limited train without a ticket, and that he would let her off at her destination; but she was carried to the station beyond her destination. It appeared that there was another daily train which stopped at plaintiff's station. The Supreme Court holds that plaintiff had sufficient notice that any agreement the conductor might make to put her off at the place she named would be a violation of the rules of the company, and no recovery can be had of the company because of the conductor's failure to keep his agreement.[9]

In Kansas it is laid down by the Supreme Court that it is the duty of a railroad receiving a freight car from another company, to inspect it and to see that it is reasonably fit for service; and, in the event that a freight-car is received with a brake beam in such a defective condition that defendant's brakeman, whose duty it is to couple the foreign car with those used by defendant, is injured in his attempt to make such coupling, and the brakeman has no knowledge of the condition of such brake-beam, and its condition cannot be readily seen, defendant is liable for such injury.[10]

In Iowa brakeman was run over while uncoupling cars; the accident was caused by his foot catching between the rail and the switch rail; and if the switch had been properly constructed, the space between said rails would have been too great to allow his foot to catch. The Supreme Court rules that the company was liable.[11]

In Michigan, it appeared that the plaintiff was employed as a common laborer on a gravel train, and he was ordered by the foreman to uncouple two cars of the train and then to jump from one to the other while one or both were in motion; when he attempted to do so the foreman, without warning, let off the brake, and thus increased the risk, so that when plaintiff jumped he fell between the cars and was injured. This work was not in the line of plaintiff's employment; he had no experience at it, and was not acquainted with the inherent danger, but did as he was told for fear of being discharged. The Supreme Court holds the railroad liable.[12]

In Georgia the Supreme Court rules that in an action by an engineer, employed by defendant railroad company, for injuries sustained in a collision, plaintiff is not chargeable with negligence on the ground that he approached a station three miles from the place of the accident at too great speed, and that the engine was not then within his control, where it does not appear that the accident was caused thereby, and no accident occurred at that station.[13]

In Texas the Supreme Court holds that where a brake was so defective as to require one letting it off to stoop down and throw his body beyond the line of the cars, and a brakeman was struck, while so doing, by a cattle-guard negligently placed too near the track, of which he had no notice, he may recover for the injury, though, by continuing in the service with knowledge of the defect in the brake, he had assumed the risk as to it.[14]

In Pennsylvania, in an action for the death of a brakeman, it appeared that defendant was in the habit of transferring the bodies of broad gauge cars to its narrow-gauge trucks, for the purpose of transporting them over its line. The usual appliances were used to make the broad-gauge cars secure on the narrow-gauge trucks, and plaintiff's intestate had formerly assisted in transferring such cars, and knew of the risks attendant upon running them on the narrow-gauge track. While riding on the top of a car that had been thus transferred, the blocking that held it to the trucks became loose, and it turned over, causing the death. The Supreme Court holds that there could be no recovery, for, though the service was dangerous, plaintiff accepted it fully aware of all its risks, and no negligence was shown.[15]

In the same state the defendant's engineer knew that the plaintiff, defendant's brakeman, had no stick to guide the link, that he must couple the cars with his hands, and that the cars were only 12 ins. apart. It was within the engineer's power to move the engine back slowly, but he jerked the lever suddenly, causing the engine to "jump back a foot," thereby crushing plaintiff's hand. The Supreme Court rules that plaintiff was entitled to damages, although he was guilty of such contributory negligence as would have been, in the absence of the engineer's wanton negligence, a complete defense.[16]

In Iowa a wiper in a roundhouse besides the cleaning of engines was required to assist in moving them in and out, and was a man of all work about the roundhouse. He was injured while coupling a car to an engine in order to remove it from the track leading to the ashpit. Other wipers were in the habit of coupling cars, though he had not done so before. The Supreme Court rules that the jury were warranted in finding that he was in the line of his duty when injured.[17]

In Kentucky a train in a yard, moving slowly backwards near a switch, by spreading the rails, caused the switch lever to strike a employé, from which blow death ensued. The Court of Appeals decides that the absence of the yard conductor and engineer from the train, who were both attending to duties in another part of the yard, did not amount to gross or willful negligence, where those in charge of the train were competent to manage it, and did in fact move it in the usual manner.[18]

In Tennessee it is laid down that an engineer is a fellow-servant with a brakeman on the same train, the conductor being in charge thereof.[19]

In the same case it is ruled that where a brakeman, in violation of the rules of the company, undertakes to make a coupling to a moving train, and is injured, he cannot recover for the injury, and it is immaterial that he was ordered to make the coupling by the engineer of the train.[20]

A Kansas statute provides that every railroad company organized or doing business in that state shall be liable for all damage done to any employé of such company in consequence of any negligence of its agents or by any mismanagement of its engineers or other employés to any person sustaining such damages. The Supreme Court holds that a firm composed of private persons, not being a railroad corporation, having a subcontract to construct a part of a railroad, and operating trains on the road in the prosecution of their work, and having servants and employés at work upon the road, and in charge of their trains, are not within the terms of this statute.[21]

In North Carolina, in an action for injuries caused by the railroad's failure to keep the approaches to its trains in a safe condition, there was evidence tending to prove that near and parallel to defendant's railroad, at the point where its train stopped for passengers, was a ditch 4 to 6 ft. wide and about 8 in. deep; that a solid bridge about 15 ft. wide crossed the ditch; that one plank was about 6 or 8 in. shorter than the others; that the shortness might easily be seen; and that plaintiff fell through the bridge at the end of the short plank. The Supreme Court rules that the court should have charged that if the jury found the facts as to the bridge and ditch as above, the only defect being that one plank was slightly shorter at one end than the other planks, that would not of itself be negligence on defendant's part.[22]

In Wisconsin the day was cold and stormy, and deceased had a shawl about his head. He had already passed several cars going in the other direction from those that struck him, and had no reason to suppose that they would return so shortly on another track. The Supreme Court rules that, under the circumstances, the jury were justified in finding that deceased was not in the want of ordinary care when he undertook to cross the track.[23]

In the Federal Court it is ruled that where one walking on a railroad track is struck by a train, the liability of the railroad company depends upon the question whether those in charge of the train, after discovering that he was not going to leave the track, used all the means in their power to stop the train before it struck him.[24]

[1] Jones v. Cincinnati, S. & M. Ry. Co., 8 So. 61.
[2] Missouri Pac. R. Co. v. Cady, 24 P. 1088.
[3] Richmond, F & P. R. Co. v. Knopf, 11 S. E. Rep. 881.
[4] Werfelman v. Manhattan R. Co., 11 N. Y. Supp. 66.
[5] Midland Ry. Co. v. Smith, 25 N. E. Rep. 153.
[6] Williams v. Brooklyn El. R. Co., 10 N. Y. Supp.. 929.
[7] A. G. S. R. Co. v. Moody. 8 South Rep. 57.
[8] Newman v. Vicksburg & M. Ry. Co., 8 South Rep. 172.
[9] Alabama G. S. R. Co. v. Carmichael. 8 So 87.
[10] M. P. Ry. Co. v. Barber, 24 Pac. Rep. 969.
[11] Brooke v. R I. & P. Ry. Co. I., 47 N. W. Rep. 74.
[12] Erickson v. M. L. S. & W. R. Co., 47 N. W. Rep. 237.
[13] Ga. Pac. Ry. Co. v. Bowers, 12 S. E. Rep. 182.
[14] Mo. Pac. Ry. Co. v. Somers, 14 S. W. Rep. 779.
[15] Titus v. B., B. & K. R. Co., 20 Atl. Rep. 517.
[16] Louisville & N. R. Co. v. Watson, 8 South Rep. 249.
[17] Grannis v. C., St. P. & K. C. Ry. Co., 45 N. W. Rep. 1,067.
[18] L. & N. R. Co. v. Coniff, 14 S. W. Rep. 543.
[19] E. T., V. & G. Ry. Co. v. Smith (T.), 14 S. W. Rep. 427.
[20] E. T., V. & G. Ry. Co. v. Smith (T.), 14 S. W. Rep. 427.
[21] Beeson v. Busenbark, 25 Pac. Rep. 48.
[22] Stokes v. Railroad Co., 11 S. E. Rep. 991.
[23] Phillips v. Milwaukee & N. R. Co., 48 N. W. Rep. 513.
[24] Saldana v. G. H. & S. A. R. Co., 45 Fed. Rep. 862.

MEETINGS AND ANNOUNCEMENTS.

Dividends.

Dividends on the capital stocks of railroad companies have been declared as follows:

Lehigh Coal & Navigation Co., semi-annual, 2½ per cent., payable in June.

Manchester & Lawrence, semi-annual, 5 per cent., payable May 2.

New York, Providence & Boston, quarterly, 2½ per cent., payable May 11.

Pittsburgh, Cincinnati, Chicago & St. Louis, 1 per cent. on the preferred stock, payable May 15.

Wheeling & Lake Erie, quarterly, 1¼ per cent. on the preferred stock, payable May 15.

Meetings.

Meetings of the stockholders of railroad companies will be held as follows:

Annapolis, Washington & Baltimore, annual, Baltimore, Md., May 4.

Atlantic City, annual. Camden, N. J., May 4.

Austin & Northwestern, annual, Austin, Tex., May 6.

Beech Creek, annual, Jersey Shore Junction, Pa., May 8.

Bellingham Bay & British Columbia, special, London and San Francisco Bank Building, California and Leidesdorff streets, San Francisco, Cal., May 4.

Canadian Pacific, annual and special, Montreal, P. Q., May 13.

Central of New Jersey, annual, Jersey City, N. J., May 8.

Cheshire, annual, Keene, N. H., May 13.

Chicago, Burlington & Quincy, annual, Chicago, Ill., May 20.

Cleveland, Cincinnati, Chicago & St. Louis, special, Cincinnati, O., May 6.

Cleveland, Lorain & Wheeling, annual, Cleveland, O., May 13.

Delaware & Hudson Canal, annual, 21 Cortlandt street, New York City, May 12.

Detroit & Bay City, annual, Detroit, Mich., May 7.

Detroit, Lansing & Northern, annual, Detroit, Mich., May 13.

Dutchess County, annual, 35 Broadway, New York City, May 4.

Eastern (New Hampshire), annual, Portsmouth, N. H., May 5.
Elmira & Lake Ontario, annual, 160 Broadway, New York City, May 7.
Elmira & Williamsport, annual, 308 Walnut street, Philadelphia, Pa., May 4.
Houston & Texas Central, annual, Houston, Tex., May 4.
Indianapolis & Vincennes, annual, Indianapolis, Ind., May 14.
Junction, special, 22 Fifth avenue, Chicago, Ill., May 5, to act upon a proposed sale of the property and franchises to the Chicago & Northwestern.
Kansas City & Omaha, annual, Fairfield, Neb., May 5.
Lake Shore & Michigan Southern, annual, Cleveland, O., May 6.
Leavenworth, Topeka & Southwestern, annual, Topeka, Kan., May 7.
Lykens Valley, annual, Philadelphia, Pa., May 4.
Louisiana & Missouri River, annual, St. Louis, Mo., May 6.
Mexican Central, annual, Boston, Mass., May 6.
Michigan Central, annual, Detroit, Mich., May 7.
Minneapolis Western, annual, Room 100, 330 Hennepin avenue, Minneapolis, Minn., May 5.
New York, Chicago & St. Louis, annual, Cleveland, O., May 6.
Norfolk & Western, annual, Roanoke, Va., May 6.
Ohio River, annual, Parkersburg, W. Va., May 14.
Philadelphia & Chester Valley, annual. 227 South Fourth street, Philadelphia, Pa., May 4.
Philadelphia, Harrisburg & Pittsburgh, annual, 227 South Fourth street, Philadelphia, Pa., May 4.
Pittsburgh, Virginia & Charleston, 233 South Fourth street, Philadelphia, Pa., May 5.
Pittsburgh & Western, annual, Allegheny, Pa., May 4.
Quebec & Lake St. John, annual, Quebec, Que., May 14.
St. Louis, Arkansas & Texas, annual, Texarkana, Tex., May 4.
St. Louis, Council Bluffs & Omaha, annual, St. Louis, Mo., May 6.
St. Louis & Memphis, annual, Lindsay, Ark., May 4.
St. Louis & San Francisco, special, Broadway and Pine street, St. Louis, Mo., May 7, to consider a proposed issue of bonds, and annual, May 13.
Shenandoah Valley, annual, Roanoke, Va., May 6.
Southern Pennsylvania, annual, 223 South Fourth street, Philadelphia, Pa., May 4.
Texas Panhandle, annual, Washburn, Tex., May 5.
Traverse City, annual, Traverse City, Mich., May 7.
Utah Central, annual, Salt Lake City, Utah, May 4.
Wisconsin Central, annual, Milwaukee, Wis., May 28.

Railroad and Technical Meetings.

Meetings and conventions of railroad associations and technical societies will be held as follows:

The *American Society of Civil Engineers* will hold its next annual convention at Lookout Mountain, near Chattanooga, Tenn., commencing May 20.

The *Association of American Railway Accounting Officers* will hold its annual convention at the Southern Hotel, St. Louis, Mo., May 27, commencing at 10 o'clock a. m.

The *Master Car Builders' Association* will hold its annual convention at the Stockton Hotel, Cape May, N. J., commencing June 9, at 10 o'clock a. m.

The American Railway Master Mechanics' Association will hold its annual convention at the Stockton Hotel, Cape May, N. J., beginning at 9 a. m., June 16. Members wanting rooms reserved are requested to apply to the Secretary.

The *New England Railroad Club* meets at its rooms in the United States Hotel, Beach street, Boston, on the second Wednesday of each month, except June, July and August.

The *Western Railway Club* holds regular meetings on the third Tuesday in each month, except June, July and August, at the rooms of the Central Traffic Association in the Rookery Building, Chicago, at 2 p. m.

The *New York Railroad Club* meets at its rooms, in the Gilsey House, New York City, at 2 p. m., on the third Thursday in each month.

The *Central Railway Club* meets at the Hotel Iroquois, Buffalo, the fourth Wednesday of January, March, May, September and November.

The *Northwest Railroad Club* meets on the first Saturday of each month, except June, July and August, in the St. Paul Union Station at 7:30 p. m.

The *Northwestern Track and Bridge Association* meets on the Friday following the second Wednesday of each month at 7:30 p. m. in the directors' room of the St. Paul Union Station, except in the months of July and August.

The *American Society of Civil Engineers* holds its regular meetings on the first and third Wednesday in each month, at the House of the Society, 127 East Twenty-third street, New York.

The *Boston Society of Civil Engineers* holds its regular meetings at the American House, Boston, at 7:30 p. m., on the third Wednesday in each month.

The *Western Society of Engineers* holds its regular meetings at 78 La Salle street, Chicago, at 8 p. m., on the first Wednesday in each month.

The *Engineers' Club of St. Louis* holds regular meetings in the club's room, Laclede Building, corner Fourth and Olive streets, St. Louis, on the first and third Wednesdays in each month.

The *Engineers' Club of Philadelphia* holds regular meetings at the House of the Club, 1122 Girard street, Philadelphia, on the first and third Saturday of each month, excepting in January, when the annual meeting is held on the second Saturday of the month. The second January meeting is held on the third Saturday. The club stands adjourned during the months of July, August and September.

The *Engineers' Society of Western Pennsylvania* holds regular meetings on the third Tuesday in each month, at 7:30 p. m., at its rooms in the Thaw Mansion, Fifth street, Pittsburgh, Pa.

The *Engineers' Club of Cincinnati* holds its regular meetings at 8 p. m. on the third Thursday of each month in the rooms of the Literary Club, No. 24 West Fourth street, Cincinnati.

The *Civil Engineers' Club of Cleveland* holds regular meetings on the second Tuesday of each month, at 8 p. m., in the Case Library Building, Cleveland. Semi-monthly meetings are held on the fourth Tuesday of the month.

The *Engineers' Club of Kansas City* meets in Room 200, Baird Building, Kansas City, Mo., on the second Monday in each month.

The *Engineering Association of the South* holds its monthly meetings on the second Thursdays at 8 p. m. The Association headquarters are at Nos. 63 and 64 Baxter Court, Nashville, Tenn.

The *Denver Society of Civil Engineers and Architects* holds regular meetings at 36 Jacobson Block, Denver, on the second and fourth Tuesday of each month, at 8 o'clock p. m., except during June, July and August, when they are held on the second Tuesday only.

The *Civil Engineers' Society of St. Paul* meets at St. Paul, Minn., on the first Monday in each month.

The *Montana Society of Civil Engineers* meets at Helena, Mont., at 7:30 p. m., on the third Saturday in each month.

The *Civil Engineers' Association of Kansas* holds regular meetings at Wichita on the second Wednesday of each month, at 7:30 p. m.

The *American Society of Swedish Engineers* holds meetings at the club house, 250 Union street, Brooklyn, N. Y. and at 347 North Ninth street, Philadelphia, on the first Saturday of each month.

The *Engineers' Club of Minneapolis* meets the first Thursday of each month in the Public Library Building, Minneapolis, Minn.

American Society of Civil Engineers.

The annual convention will be held at Lookout Inn, Lookout Mountain, near Chattanooga, Tenn., beginning May 21. Reduced rates of railroad fare will be given on the certificate plan. A special train will probably go from New York, by the Central, the "Big Four," and the Cincinnati Southern.

Canadian Civil Engineers.

The regular meeting of the Canadian Society of Civil Engineers was held in its rooms at Montreal last week, Mr. Wm. Kennedy, Harbor Engineer, presiding. A very interesting paper on "Mining in British Columbia" was read by Mr. Thomas Drummond, C. E., and was discussed by many of the members.

Engineering Association of the South.

The monthly meeting of the association was held at Nashville, Tenn., April 9, with Vice-President W. L. Dudley presiding, and 25 members and visitors present. The election as a member of Mr. P. W. Perry, Assistant Engineer of the Maplewood Improvement Co., was announced. A memorial of E. Parton was read, and a committee was appointed to draft a memorial of H. S. Butler, of Anniston, recently deceased, a member of the association. The chairman was authorized to appoint a committee of five to ask the American Society of Civil Engineers to stop at Nashville on its way to Lookout Mountain, and, if practicable, to hold one session of the annual convention at Nashville. The paper of the evening entitled the "Engineering Profession," was read by Major W. F. Foster, of Nashville. The society proposes to publish this address in pamphlet form.

Engineers' Club of Philadelphia.

A business meeting was held April 18. President Wilfred Lewis in the chair; 25 members and one visitor present. The President brought before the meeting the question of the incorporation of the club, and the Secretary read the following abstract from the minutes of the board meeting held that day:

"On motion of Prof. Spangler, it was ordered that the Board unanimously recommend to the meeting to-night that the club authorize the Board to take such steps as may be necessary to effect the incorporation of the club."

On motion of Mr. Henry G. Morris it was unanimously ordered that the officers of the club be directed to carry out the above recommendation of the Board of Directors.

The tellers of election reported that the following gentlemen had been elected members of the club: Active members, Messrs. J. Clarence Ogden, John S. DeHart, Jr., Chas. B. Colby, C. Louis E. Amet, Hermann S. Hering, Albert R. Cline, J. Adelbert Patton, Wm. H. Boardman and Fred C. Dunlap; associate member, Mr. David S. B. Chew.

Mr. John C. Trautwine, Jr., presented for Captain S. C. McCorkle, an illustrated paper on Landlocked Navigation from Long Island Sound to the Mississippi River. Of this paper the author says that it might be supposed that the unities had not been followed, but that he has simply given that portion of the route from the Suwanee River to the Mississippi with which he is most familiar, leaving to the United States and Civil Engineers the Florida Ship Canal, which is the key to the whole project. That portion of the route between Long Island Sound and the St. Mary's and St. John's rivers is well known to many persons. The portion of the route referred to between West Florida and Louisiana, has for its initial point the Suwanee River. It is variously estimated that the distance from the Suwanee River to St. Marks is from 70 to 90 miles, the former referring to a direct cut, and the latter to a dredged line. From St. Marks to the Mississippi there is a water line nearly all the way, but requiring improvement.

The Technical Conventions.

The Secretary of the Master Mechanics' Association informs us that he has received several protests against a charge of $6 a day which it is rumored will be made at the Stockton Hotel, Cape May, for persons occupying rooms by themselves at the coming conventions there. He says that "the proprietor of the hotel has distinctly engaged to accommodate the members of the Association, and others attending the convention, at the uniform rate of $3 per day, when extras are not demanded." He asks that we give this matter publicity.

PERSONAL.

—Mr. Edwin Weymouth, who has been a passenger conductor on the Boston & Maine for 43 years, died at his home in Charlestown, Mass., this week.

—Mr. Samuel Pullman, formerly Master Car Builder of the Illinois Division of the Chicago, Rock Island & Pacific, will shortly visit the Pacific coast. He is in ill health.

—Mr. Wm. W. Wilson, formerly Superintendent of Machinery of the Chicago & Alton, is believed to be hopelessly ill. He has been at Hot Springs, Ark., for some months, but gradually grew worse, and was removed to Chicago last week.

—General John Newton, of New York, Consulting Engineer of the Chicago Drainage Canal, has resigned, and Mr. William Worthen, Chief Engineer, has also resigned. Mr. Worthen is now Chief Engineer for the New York Rapid Transit Commission.

—The election this week of Mr. James McCrea, Second Vice-President of the Pennsylvania Lines West of Pittsburgh, as First Vice-President, to succeed the late Mr. J. N. McCullough, has been anticipated. Mr. McCrea will have charge of the Transportation and Traffic departments.

—Mr. S. W. Reynolds, who has been Clerk and Treasurer of the Mexican Central, was elected President this week, to succeed the late Mr. Levi C. Wade. Mr. Reynolds has been Treasurer of the company since it was organized. Mr. Edward W. Jackson, General Manager, has been elected Second Vice-President.

—The Governor of Texas has appointed United States Senator John H. Reagan, Chairman of the new Texas Railroad Commission. Senator Reagan has been in public life since 1857, when he was elected to Congress. He has made a study of the railroad question, and was the leader in the House of Representatives in securing the passage of the Interstate Commerce Bill through the House. In the Senate he has been a member of the Committee on Interstate Commerce.

—Mr. J. L. Watkins has been Ticket Agent of the Chicago, Burlington & Quincy at Mendota, Ill., for 30 years, and until two years ago acted as night agent as well as day agent. In all this time he has never ridden on the cars more than two or three times. Lately he was subpœnaed as a witness in a lawsuit at Wheaton, Ill., and was obliged to go; but it was so unusual for him to step aboard a train that the event was chronicled as news.

—Mr. William H. Burr, recently General Manager of the Phenix Bridge Company, has purchased an interest in the business of Sooysmith & Company, contracting engineers, No. 2, Nassau street, New York, and on June 1 will become Vice-President of the company. As our readers doubtless know, the firm carries on business as contracting and superintending engineers for bridges, substructures, foundations, docks, tunnels, etc., and has successfully carried out some very important enterprises. It controls in this country the Poetsch freezing process.

—Mr. Philip L. Moen, of Worcester, Mass., President of the Washburn & Moen Mfg. Co., died at his home in Worcester, April 23, aged 67 years. Mr. Moen had been President of the Washburn & Moen Mfg. Co. for the last 20 years. The company was organized in 1868. He was a partner in the old firm of Washburn & Moen and a son-in-law of Mr. I. Washburn, the first president of the corporation. The company is the largest wire manufacturing establishment in the world, and its mills at Worcester employ 3,500 men. Recently land has been purchased at Chicago for a Western plant.

—Major Peyton Randolph, Vice-President of the Richmond & Danville, died at his house in Washington, D. C., this week. He leaves a widow and five daughters. Major Randolph was born near Winchester, Va., in 1833, and graduated in civil engineering at the Columbian University. He was engaged in railroad engineering when the war began, and immediately joined the Confederate Army and served on the staff of General Armistead. He was with Pickett's division at Gettysburg, and during the latter portion of the war served in the Army of Northern Virginia as Major of Engineers. Soon after the war he became General Superintendent of the Virginia Midland road, and when it was added to the Richmond & Danville system he was rapidly promoted from Assistant Manager to Third Vice-President. Major Randolph has been ill for some time, and has not been able to give much attention to railroad affairs since his appointment as Vice President in February. His death was caused by dropsy of the heart.

ELECTIONS AND APPOINTMENTS.

Beardstown, Fort Madison & Sioux City.—The following officers were elected at a meeting in Fort Madison, Ia., last week; C. V. Chandler, Macomb, Ill., President; W. J. McCray, Fort Madison, S. B. Montgomery; Rushville, Ill., and H. S. Schmodt, Beardstown, Ill., Vice-Presidents; Charles Doerr, Fort Madison, Secretary, and H. D. McConn, Fort Madison, Treasurer. The following directors were elected: John S. Nicholson, Henry Schmoldt, Beardstown; Rus Griffith, S. Clanus Montgomery, Rushville; James E. Vail, Industry, Ill.; Chas. V. Chandler, Albert Eads, Macomb, Joseph M. Beck, Charles Brewster, Samuel Atlee, Nelson C. Roberts, William J. McCray, James H. Daffus, George H. Schaffer and Dennis R. Morrison, Fort Madison.

Bridgeport & Decatur.—The company has been reorganized, and the following directors were elected at Decatur, Tex., April 22: Morris R. Locke, of El Paso, President; W. W. Flood, of Decatur, Vice-President; Henry Greathouse, Treasurer; Abraham D. Loke, Jerseyville, Ill., Secretary; Charles E. Moore, Detroit, Mich., Chief Engineer; Morris B. Locke, Wichita Falls, Tex., Superintendent.

Caffrey Central.—The following directors have been elected: Albert Baldwin, John Barkley, Frank T. Howard, Jules M. Burguieres, Chapman H. Hyams, Isaac Delgado and Thomas Sully.

Catskill Mountain.—The following have been elected directors of the road: Lewis Wolfe, C. L. Rickerson, A. Van Santvoord, C. T. Van Santvoord, G. M. Snyder, John Sanderson, F. G. Walters, D. W. Jennings, E. A. Chase, F. Hill, C. L. Beach, C. A. Beach, W. J. Hughes.

Chatanooga Terminal & Suburbrn.—The following directors were named in the articles of incorporation, filed at Chattanooga last week: A. A. McCorkle, J. H. Hayes, J. W. Dow, J. K. Polk and A. M. Womble.

Chicago, Milwaukee & St. Paul.—J. B. Elwood has been appointed Superintendent of the sleeping-car department, vice W. O. Chase, who returns to the Wagner Palace Car Company as Superintendent of the Chicago division.

Cincinnati, Saginaw & Mackinac.—The following directors were elected at the annual meeting of the shareholders held last week: A. W. Wright, W. J. Spicer, L. J. Sergeant, E. W. Meddaugh, W. R. Burt, J. C. Stone and S. O. Fisher. The directors elected the following officers: President, A. W. Wright; Vice-President, L. J. Sergeant; Secretary and Treasurer, James H. Muir.

Delaware & Hudson Canal Co.—James Calhoun has been appointed General Freight Agent of this company, with headquarters at Albany, N. Y., to take effect May 15.

Durham & Northern.—L. T. Myers has been appointed General Superintendent, with headquarters at Portsmouth, Va. William Smith has been appointed Superintendent, with headquarters at Raleigh, N. C.

Genessee & Wyoming Valley.—The directors for the first year are: Charles Q. Freeman and Edward R. Chapin, of York, N. Y.; Pell W. Foster, Edward W. Brown, J. S. Andrews, A. W. Trotter, A. A. McCreary,

William Foster, Jr., and Charles Stone, of New York; Robert S. Walker and Edward W. Keese, of Flatbush, N. Y.; William V. Reynolds, of Schaghticoke, N. Y., and James W. Shaw, of Orange, N. J.

Grand Trunk.—At an adjourned meeting of the shareholders of the company held in London, April 28, Sir Henry W. Tyler, the President, and the old board of directors were re-elected by a vote of 47,230 shares against 20,799.

Gulf, Colorado & Santa Fé.—L. D. W. Van Vliet having resigned, C. S. Hayden has been appointed Division Superintendent of the Southern division, with headquarters at Temple, Tex.

Illinois Central.—A. J. McDougal, who has lately represented the company in Canada, has been appointed General Eastern Passenger Agent of the road, with headquarters at 343 Broadway, New York City.

Kansas & Arkansas Valley.—The annual meeting of the stockholders was held at Little Rock, Ark., April 23. The following directors were elected: Jay Gould, George J. Gould, Edwin Gould, S. H. H. Clark, George E. Dodge, F. R. McKibben, S. R. Hayes, W. H. H. Shibley and Thomas Essex. The officers are as follows: George J. Gould, President; S. H. H. Clark, Vice-President; A. H. Califf, Secretary and Treasurer; Thomas Essex, Assistant Secretary and Treasurer.

Keystone.—The company has been incorporated in Pennsylvania by the following directors: H. Clarence Rich, Emporium, Pa., President; Herbert C. Rich, Cattaraugus, N. Y.; L. G. Wilson, N. H. Parker, C. R. Rich and R. B. Ford, Gardeau, Pa., and N. H. Sizer, Shippen, Pa.

Mexican Central.—At a meeting of the directors April 27, Treasurer S. W. Reynolds was elected President, Warren Sawyer Treasurer, pro tem., and E. Rollins Morse, clerk pro tem. Edward W. Jackson, General Manager, was elected second Vice-President and General Manager.

Mobile & Western.—Daniel H. Campbell, Neil McCarron, Archibald McDonald, F. G. Ruffin, Jr., A. Nisbit Turnbull, Elmo Christman and Cecil Fraser are the directors of the company. A. Nisbit Turnbull is the President and Treasurer; and Neil McCarron is Secretary.

New Orleans & Northwestern.—The annual meeting was held in Natchez, Miss., April 20, and the following directors were elected: L. K. Hyde, Titusville, Pa.; F. C. Henderson, Sioux City, Ia.; J. W. Craney, Kansas City, Mo.; B. F. Hammett, St. Louis, Mo.; T. E. Morrison, A. H. Foster, F. S. Shields, Thos. K. Green and James W. Lambert, Natchez. The directors elected the following officers: President, B. F. Hammett; Vice-Presidents, L. K. Hyde, T. E. Morrison and J. W. Craney; Secretary, James W. Lambert, and Treasurer, Wm. H. Mallery.

Northeastern Elevated.—The company has been organized in Philadelphia with the following directors: J. L. Grieb, Philadelphia, President, and Charles B. Truitt, Edward L. Bodin, Wm. A. Rorex, Wm. L. Tete, Jas. L. Grieb and John H. Wanner, all of Philadelphia.

Ohio Southern.—At the annual meeting of the directors in Springfield, O., April 21, the following officers were elected: President, Alfred Sully, New York; Vice-President and Treasurer, Henry Graves, New York; Secretary, Wilberforce Sully, New York. The only changes made in the directory were the following: General A. S. Bushell, vice A. J. Beckley; Maurice Sternberger, vice Superintendent W. R. Van Tassel.

Orlando & Mosquito Inlet.—The company has elected the following directors: John G. Sinclair, Nat Poyntz, Mahlon Gore, C. G. Butt, J. T. Beeks, and W. A. Rowland, Orlando, Fla., and George F. Foote, Zellwood, Fla.

Orlando & Oakland.—The following directors of this new Florida company have been elected; N. Poyntz, Mahlon Gore, J. D. Beggs, N. L. Mills, S. S. Waterhouse, L. C. Massey and J. M. Cheney, all of Orlando, Fla., and H. S. Kedney, of Winter Park, Fla.

Pennsylvania Co.—The directors of this company elected the following officers last week: George B. Roberts, President; James McCrea, First Vice-President; J. T. Brooks, Second Vice-President and General Counsel; Thomas D. Messler, Third Vice-President; John E. Davidson, Fourth Vice-President; S. B. Liggett, Secretary; T. H. B. McKnight, Treasurer, J. W. Renner, Comptroller, and Albert McElery, Assistant Comptroller.

Pittsburgh, Cincinnati, Chicago & St. Louis.—The Board of Directors met in Philadelphia April 24, and elected the following officers: George B. Roberts, President; James McCrea, First Vice-President; J. T. Brooks, Second Vice-President and General Counsel; Thomas D. Messler, Third Vice-President; John E. Davidson, Fourth Vice-President; S. B. Liggett, Secretary; Stephen W. White, Assistant Secretary; T. H. B. McKnight, Treasurer; John W. Renner, Comptroller, and Albert McElery, Assistant Comptroller.

Port Townsend Southern.—The following were elected officers at the annual meeting at Port Townsend Wash.: President, W. H. Starbuck, New York; Vice-President, C. J. Smith, Portland; Secretary, H. McLennan, Seattle; Directors, F. H. Prince, Boston; W. H. Starbuck, C. J. Smith, J. C. Haines, H. McLennan, C. Eisenbeis, and T. O. Jackman.

Pullman's Palace Car Co.—The following transfers and appointments have been made: A. W. Giltzow, District Superintendent, transferred to Western District, Chicago, vice J. B. Elwood resigned; M. E. DuBois, District Superintendent, St. Louis, transferred to Central District, Chicago, vice A. W. Giltzow; F. H. Crane, District Superintendent, Kansas City, transferred to St. Louis, vice M. E. DuBois; F. C. Dennis, appointed District Superintendent, Kansas City, vice F. H. Crane, transferred.

Raleigh & Gaston.—H. M. Robinson, for some time Roadmaster of the Atlantic Coast Line, has accepted a similar position on this road.

Richmond & Danville.—The announcement is made with regret of the death of Peyton Randolph, late Third Vice-President. W. H. Green, General Manager, will represent the Executive Department in the direction of the Accounting and Treasury departments.

South Carolina.—J. H. Agnew, Master Mechanic of this road, has been appointed Superintendent. Officers in the maintenance of way, machinery and transportation departments heretofore reporting to the General Manager now report to the Superintendent. H. O. Dunkle having resigned the office of Master of Transportation that office has been abolished.

South Dakota Railroad Commission.—The State Comissioners met for organization at Watertown, S. D., April 21. The commissioners are: H. J. Rice, of Huron, President; A. D. Chase, of Watertown, and C. E McKinney, of Sioux Falls. J. L. Robinson, Secretary, resigned, and H. E. Mayhew, of Woonsocket, was elected his successor. The head office of the commission is at Huron, S. D.

Springfield, Sedalia, Marshall & Northern.—The following are the directors named in the charter filed in Missouri last week: J. L. Bush of Pennsylvania; J. B. Ross, D. L. Griffith, J. Hawkins and W. D. Sheppard, Springfield, Mo.; William Smith Peter, Buffalo; R. H. Moses, W. L. Porter, W. H. Powell, Jr., Sedalia, Mo.; William A. Walker and J. P. Huston, Marshall; and Isaac Myers, Miami, Mo.

Staten Island Rapid Transit.—At the annual election of the company, held April 28, at their offices in New York City, the following directors were elected: Chas. F. Mayer, Orland Smith, Thos. M. King, C. K. Lord, Frank S. Gannon, G. Atkinson, C. J. Ryan, J. Frank Emmons, A. B. Boardman, James M. Davis, E. Wiman, O. S. Wood and Chas. Watrous. This company leases the Staten Island Railway, and operates it as part of its system.

Union Pacific.—The present board of directors was elected at the annual meeting in Boston, April 29, except that S. H. H. Clark succeeds W. H. Holcomb. The directors organized as follows: President, Sidney Dillon; Vice-President, S. H. H. Clark, Second Vice-President, G. M. Lane; Controller, Oliver W. Mink; Treasurer, G. Harris; Secretary, Alexander Millar.

RAILROAD CONSTRUCTION,
Incorporations, Surveys, Etc.

Adel & Moultrie.—The organization of this company in Georgia was completed last week. The road is to extend from Adel to Moultrie, Ga., a distance of 20 miles.

Beardstown, Fort Madison & Sioux City.—The company was organized at Fort Madison, Ia., last week, and the articles of incorporation have been filed in Illinois. The road is to begin at Beardstown and will extend through Rushville, north to Macomb, Ill., and thence west to Fort Madison, Ia. The capital stock is $2,000,000. The principal office will be at Fort Madison. The road is projected by local capitalists of Beardstown and Fort Madison, and it is expected that either the Baltimore & Ohio or the Ohio & Mississippi will agree to operate the line when it is completed.

Branchville & Bowman.—This company was recently chartered by the late South Carolina Legislature, and has been organized with Samuel Dibble, President; B. H. Moss, Vice President, and E. T. R. Smoak, Superintendent. It has purchased the Smoak tramway road, which is completed for nine miles, and it is proposed to extend it some distance.

Bridgeport & Decatur.—It is proposed to extend this line from Decatur east to Denton, Tex., on the Missouri, Kansas & Texas, a distance of about 25 miles. The two towns will probably issue bonds to build this part of the line.

Canadian Pacific.—The line is being relaid between Winnipeg and Port Arthur with new 72-lb. rails, and from Ottawa River westward the trestles and bridges are being either filled in with earth or replaced with stone structures. Extensive improvements are contemplated in the mountain section during the present and coming year, and very large additions will be made this year to the rolling stock. Sixty locomotives and a great many freight and passenger cars have already been ordered. The Souris branch to the coal fields will be constructed this year. The company, President Van Horne says, does not intend building a bridge across the Red River at Selkirk, Man., as reported.

Chattanooga & National Park.—J. C. Henderson, of Chattanooga, President of the road, states that the company now has ample money to build the road and is only waiting for the government to give permission to build through its property. The line has been fully surveyed and the right of way granted up to the government line. That is all that is now holding the work back.

Chattanooga Terminal & Suburban.—This company was incorporated at Chattanooga, Tenn., last week, previous to a consolidation of the Chattanooga Belt and the Lookout Mountain line under that name. These roads were recently purchased from their present owners. The reorganization and merger of the two corporations is now nearly completed.

Chesapeake & Ohio.—The belt line to be built at Covington, Va., is being constructed to reach the different industries and manufacturing establishments which are to be located on the lands of the Covington Improvement Co. The line will practically be a sidetrack for the present, and the track to be laid at present will probably not exceed one mile. The work will be done by the company.

Chicago, Rock Island & Pacific.—Surveying has been in progress for the last month and a half in the neighborhood of Omaha, Neb., to demonstrate whether a line through the bluffs at the Missouri River is feasible. There is no prospect of its being built at present. These surveys gave rise to the recent reports that it was proposed to build a road to connect the line from Albright with the line ending at Council Bluffs, by building a road through South Omaha and bridging the Missouri River.

Choctaw Coal & Railway Co.—The grading has been recently resumed at El Reno, in Oklahoma, east of the Atchison, Topeka & Santa Fe track, from the present terminus near Yukon. The work will be pushed to completion as fast as possible, and the road will then be operated between El Reno and Oklahoma City. When this gap of nine miles is completed work will begin on the line east to the mines at South McAlester. The right of way difficulties at Oklahoma City have been adjusted.

Coos Bay, Roseburg & Eastern.—The preliminary survey will be started this week by Chief Engineer Miller. The western terminus will be at Millicoma, located on Coos River opposite Marshfield, Or. The road will extend along the Coos River and across the Coos range to the town of Winchester, six miles north of Roseburg. The line is 60 miles in length over the route finally adopted. The grading will probably begin before June 1.

Drayton Harbor, Lynden & Spokane.—This company, which was recently organized for the purpose of building a line from Drayton Harbor through Lynden and the Nooksack valley, has been guaranteed subsidies enough in cash and land to construct 30 miles of the line. Drayton, Wash., has donated 1,000 acres of land, Blaine promises $100,000 in cash, and Lynden will give $14,000 in cash and the same amount in property. Nearly all the right of way has been secured and the line is located as far as Lynden. C. T. Moore, of Drayton Harbor, is one of the directors.

Duluth & Iron Range.—A local paper printed a statement that it is proposed to build a branch line along the Mesaba Mountains to reach the mineral lands on the range. A competitive line, the Duluth, Mesaba & Northern, is projected to extend to the mountains. The line proposed will be about 30 miles long, and will be run due west from Mesaba station.

Duluth, Pierre & Black Hills.—A press dispatch from Pierre, S. D., states that arrangements are being made by this company with the Chicago & Northwestern to purchase the branch of the latter between Aberdeen and Oakes, 45 miles. This road is projected to extend from Oakes to Pierre, 180 miles, and has completed 45 miles between Aberdeen and Faulkton, and the grading is soon to begin from south of the latter town to Pierre. The road is to be operated by the Northern Pacific, and it is understood that it is prepared to build a parallel line from Aberdeen to Oakes to connect with the Northern Pacific if it cannot secure the line of the Chicago & Northwestern.

The contract was let this week for the first eight miles from Faulkton, S. D., south toward Pierre. The first three miles was awarded to Spencer Bros. of Spink County, and the balance to a Faulkton contractor. The engineers are running a new survey on the last eight miles to Pierre, to locate the route into that town.

Fincastle & Troutville.—Ground was broken at Fincastle, Va., last Thursday, for a road from that town to some point on the Shenandoah Valley Railroad to be decided on hereafter. Thomas Heenan is General Manager.

Florida.—Bills have been introduced in the State Legislature to incorporate the following roads: The Homosassa & Withlacoochee; the Okahumpka & Sumterville; the Arcadia, Gulf Coast & Lakeland; the Florida, Georgia & Western; the West Florida & Atlantic & Alabama, the Georgia, Florida & Key West and the Tallahassee & Western.

Frankville & Abbeville.—The Caffrey Central Sugar Refinery & Railroad Co., Ltd., which was organized in Louisiana last week, proposes among other things to acquire control of this road by an exchange of stock or purchase, and to extend it to its factory and other points. The railroad was organized May 17, 1890, to build through St. Mary Parish, La.

Genessee & Wyoming Valley.—The articles of incorporation of this company have been filed in New York. The road, which is to be about 25 miles long, will be constructed from a point near Perry, Wyoming County, to a point near Caledonia, in Livingston County, with a branch to a connection with the Western New York & Pennsylvania road at Piffard, York. The capital stock is $500,000.

Georgia, Carolina & Northern.—The track has been laid to a point west of Elberton, Ga., toward Athens, and trains will be running to the latter town by July. The road will be completed to Atlanta by December. It is already graded to Lawrenceville, and the work is being pushed rapidly towards Atlanta.

Glen Hazel & Shawmut.—A charter was granted in Pennsylvania this week to this company. The capital stock is $150,000. The road will be 15 miles long, extending from a point on the New York, Lake Erie & Western at Kettner's Station to a point near Daguscahonda, on the Philadelphia & Erie road. The President is S. S. Bullis, of Olean.

Harriman Belt.—William Kenefick, of St. Louis, has awarded the contract for constructing the 14 miles of the road to be built by the East Tennessee Land Co., from Hariman to Brushy Mountain, Tenn.

Huntington & Big Sandy.—Track laying on the road in West Virginia is progressing rapidly. The track is completed from St. Cloud to Four Pole River, and the workmen have been transferred to the Huntington end of the line and are completing the gap between the Ninth street terminus and St. Cloud. Work has been somewhat delayed on the bridge across Four Pole River on account of the high water. The water is falling rapidly now and it is probable work will be resumed next Monday. The line between Huntington and Kenova, W. Va., will be 12 miles long.

Jefferson & Southeastern.—Captain W. S. Hayward is surveying the line from Jefferson southeast to Wascom, Tex., on the Texas & Pacific, a distance of 26 miles.

Johnson City & Carolina.—The construction work on this branch of the East Tennessee, Virginia & Georgia is now practically completed, and trains will be running by May 15. The last work to be completed was the bridge over the Nolachucky, at Embreeville, the terminus of the line, near Bumpass Creek. The road is in East Tennessee and is about 16 miles long. It connects with the East Tennessee road, two miles west of Johnson City. The stations are Johnson City, Dorr's Mills, Garber's Mill and Embreeville. The contractors were Purdy & Rexford, of New York. The one iron bridge on the line has a span 200 ft. long. The maximum grade is 66 ft. per mile and the curvature is four degrees.

Kanawha & Michigan.—P. C. Robinson, with a corp of engineers, commenced a preliminary survey last week for the Charleston & Gauley, the proposed extension of this line up the Gauley River. The branch will begin from Malden, near Charleston, W. Va., and extend to Kanawha Falls. The engineers state that it will probably be completed this year.

Kansas City, Bentonville & Southeastern.—The contract for grading this road south from Bentonville, Ark., has been let to Watson & Schneider, of Cameron, Mo. Work will be commenced at once, and it is proposed to complete most of the line this summer. The line is to extend from Bentonville to Pineville, McDonald County, Mo., and near that town it will connect with the Kansas City, Fort Smith & Southern.

Kansas City, Osceola & Southern.—This company was incorporated in Missouri last week with a capital stock of $1,150,000. The road is a reorganization of the Kansas City & Southern, which was sold at foreclosure

last week. The line extends from Kansas City south to Osceola, Mo., 111 miles. The entire capital stock is owned by John I. Blair.

Keystone.—The company was incorporated in Pennsylvania last week. The charter is for a period of 10 years. The road is to extend from a point on the line of the Western New York & Pennsylvania in Shippen Township, Cameron County, Pa., near Gardeau, to Monroe, in Norwick Township, McKean County, Pa. The length of the road is about seven miles. The capital stock is $70,000. H. C. Rich, Emporium, Pa., is President.

Little Falls & Dolgeville.—The contract for the grading between Little Falls and Dolgeville, N. Y., 12 miles, was let this week to Stephen A. Dutton, of Little Falls, N. Y. The contract for building the stations was also awarded to him, with other work, which will bring the value of his contract to $400,000. P. N. Casler, of Little Falls, has the contract for the timber work. The contractor has about 150 men now at work. The heaviest grade on the line is 78 ft. per mile, and the curvature is three degrees. The only difficult work will be near Little Falls, where connection will be made with the New York Central & Hudson River road. The location at this point has been a perplexing matter. The route adopted will permit the construction without much change of an overhead bridge at Little Falls or of the switchback, whichever project is decided upon. Warren H. Loss, of 10 Wall street, New York City, is President.

Memphis, Little Rock & Pacific.—During February and March the Chief Engineer of this road made a new survey for the line between Little Rock and Hot Springs, a distance of about 50 miles. The contract for grading part of the distance between these towns has been let to A. P. Aldrich, who has a small force working near Hot Springs. The officers state that this section will probably be completed before January. Surveys are also to be made this year from Hot Springs southwest to the Indian Territory line for a distance of about 150 miles from Little Rock. H, A. Schwanecke, of Little Rock, is the Chief Engineer.

Mexican Mineral.—The construction of this line from Palmarego to Zapote, State of Chihuahua, Mex., is expected to be completed in August next. The construction was begun early in 1889. The road is being built in connection with Palmajero Mining Co., the control of the two companies being in about the same hands. A project to supply water power to the mines at Zapote is also being advanced by the same interest.

Mexico, Cuernavaca & Pacific.—The company is almost ready to commence the preliminary construction work. The engineer in charge, Major Butman, will begin next week to make some further surveys, and when he makes his report work will begin immediately. The road is projected from the City of Mexico to the Pacific coast, and the officers claim will be pushed vigorously until completed.

Missouri, Kansas & Texas.—The line from Waxahachie south to Hillsboro, Tex., a distance of 35 miles, was opened to passenger traffic April 26. The extension completes the Dallas & Waco branch, heretofore in operation between Dallas and Waxahachie, 31 miles.

Missouri Pacific.—The company has commenced laying the rails on the Plattsmouth cut-off line. The rails are 66 lbs., the line being intended for fast traffic. It is proposed to lay the rails at the rate of one mile per day, and complete the line to Plattsmouth, Neb., in about two weeks, and to have the through trains running to Omaha by June 15.

Mobile & Western.—A certificate of organization of the company was filed in the office of the Secretary of State, at Montgomery, Ala., April 20. The proposed road is to extend from Mobile in a westerly direction to some point on the Alabama state line. The capital stock is $360,000.

Nashville, Chattanooga & St. Louis.—The surveys for the Tennessee & Coosa extension, now being made by C. P. Yeatman. Locating Engineer, are for a line running from Huntsville south to near Whitesburg, on the Tennessee River, then east and southeast avoiding high water of the Tennessee River as much as possible, to Rickett's Gap where it joins the line from Bell Factory Station to Guntersville. On this line there would be considerable pile trestling. It is about 32 miles long and 18 miles is located. The line from Bell Factory has been located. A contract for all the work is let to Messrs. Allison Shafer & Co., 303 Commerce Building, Louisville, Ky.

Natchez, Red River & Texas.—This road is now a narrow-gauge line extending from Vidalia, opposite Natchez, Miss., west to Trinity, La., about 25 miles. The officers state that the line will be changed to standard gauge before summer, and it is proposed also to build an extension from the western terminus at Black River southwest to Alexandria, La., about 40 miles distant.

New River & Kanawha.—A meeting of the stockholders of this company was held last Thursday at Fayetteville, W. Va. The directors were instructed to begin negotiations looking to the commencement of work by June, if possible. The company was chartered a month ago in West Virginia. All of the capital stock has been paid in. The road is to connect the New River with with the Kanawha River, beginning at a point in Fayette County, and extending to a point on the Chesapeake & Ohio.

New Roads.—The right of way has been secured for a road which is to be built by a local company from Norwalk south through Huron County, to North Fairfield, O. The line will be about 10 miles long and the right of way has been granted for six miles. If the road is completed to North Fairfield this summer an extension may be built in the fall south to a connection with the Cleveland, Cincinnati, Chicago & St. Louis at Greenwich or New London. It is stated that the Wheeling & Lake Erie will operate the branch.

Grading has been commenced for a short road from Wallace, Idaho, near the Northern Pacific station, up Nine Mile Creek toward the Bitter Root Mountains. There is some difficult bridge work in the cañon which may delay the completion of the line until July.

A company has been formed at Paris, Ark., to build a road from that town north to Coal Hill, Ark., near the Arkansas River, on the Little Rock & Fort Smith road. The line will be about 10 miles long, through Logan County. About $30,000 of the capital stock has been subscribed at Coal Hill and Paris.

Nolan Creek.—The engineers commenced the survey last week, and are now running a line from Castle, Col., on the Denver & Rio Grande, near Aspen, to Nolan Creek, a distance of 18 miles. It is stated that the grading will be commenced in a few weeks.

Northampton & Hertford.—This company proposes to build a road from Garysburg to Jackson, N. C., and elections are to be held in Jackson and Occoneechee townships to decide as to the subscription of $15,000 each to the road. The company was chartered by the last North Carolina Legislature. H. W. Lewis is President and J. A. Burgwyn is Treasurer.

Northeastern Elevated.—The articles of incorporation were filed in Pennsylvania, April 24. The company proposes to build a road about 14 miles long, extending from Shoemakertown, Montgomery County, to League Island, at Philadelphia. The capital stock is $140,000. James L. Grieb, Philadelphia, is President.

Pajaro Valley.—The route of this road in Southern California has been definitely established from the Moro Cojo to Salinas and the right of way secured. The route runs across from the Moro Cojo to Blanco, thence along the county road to its junction with the Monterey road. The station will be about a mile from Salinas. The road will not be ready for freight and passenger traffic for a few months.

Pittsburgh, Akron & Western.—The most important work now in progress on this line is on the eastern section near Akron. It is stated that the company will have about 1,000 men on the ballasting this month. The trains have been running to Akron since Februury. The bridge over Howard street at Akron will be finished by May 10, and trains will run into the city after that date. The bridge is over the canal and is nearly 1,000 ft. long. It is stated that engineers are making a survey between Akron and Youngstown.

Pittsburgh & Western.—A connecting line about half a mile long is being built at Akron, O., to connect the tracks of this road with the Cleveland, Akron & Columbus. The new branch is being built for the accommodation of the trains of the Baltimore & Ohio, which is reported to have leased trackage rights over the Cleveland, Akron & Columbus from Warwick north to Akron, about 14 miles. If this lease has been made it probably means that the tracks of the new Akron & Chicago Junction road out of Akron cannot be used for some reason, as that road practically parallels the Cleveland, Akron & Columbus from Akron south to Warwick.

The branch of this road to the stone quarries at Windsor, Geauga County, O., which was opened last week, is about eight miles long. About 15 carloads of stone are being shipped daily at present, but double that amount will be transported in a few weeks.

Rapid City, Missouri & St. Paul.—The survey for this line was commenced at Rapid City, S. D., last week. The engineers are to locate the line easterly to the Cheyenne River, a distance of 40 miles, and when that point has been reached it may be decided to continue the survey to the Missouri River. The company is a local one, and about $150,000 has been subscribed by the directors in Rapid City; and it is expected that an additional $100,000 will be entirely subscribed in a few weeks.

Red River & Southwestern.—Burkett, Burns & Murphy, of Taylor, Tex., who have the contract for grading this road between Henrietta and Archer, Tex., 30 miles, have let nine sections of the grading to subcontractors, and they have begun work on the first 16 miles. The grading is to be completed to Arthur by July 1, and by that time further contracts for construction between Archer and Abeline will probably be let. A line may also be built from Henrietta north about 15 miles to Red River, to connect with the Chicago, Rock Island & Pacific.

Richmond, Nicholasville, Irvine & Beattyville.—The work on the extension of the line beyond Richmond, Ky., to which it was completed last year, has been recently resumed. About 100 men are working between Richmond and Irvine, 23 miles, laying the track. The other work on the line has been suspended for the present. The grading has been completed for about half the distance to Beattyville, which is 35 miles south of Irvine. After leaving Richmond the road passes through Waco, Centreville and Little Rock, to Irvine and Millers Creek, and thence along the south bank of the Kentucky River to Beattyville. The bridge at Miller's Creek will be the second over the the Kentucky River. It is to be 1,280 ft. long, with a channel span 257 ft. long. The contractors are D. Shanahan & Co., of Louisville, John Mitchell, of Louisville, and L. F. Mann, of Beattyville. The work now being done is very heavy. The maximum grade is 90 ft. per mile and the maximum curve is nine degrees. This is only on one section of the line, and no other grades exceed 66 ft. per mile.

St. Albans & Coal River.—The company has concluded a contract for the grading of its road from St. Albans to Madison, W. Va., a distance of 42 miles. The contract includes the building of all stone culverts. The work will be begun before June 1. P. O'Hern, of Charleston, W. Va., is President.

St. Louis, Grand Tower & Southern.—The contract for building 20 miles of this line from East St. Louis, south, was let by the directors last week. The road is to extend from East St. Louis, south, along the Mississippi River bank to Grand Tower, Ill., a distance of about 60 miles. A preliminary survey has been made, and the engineers are to begin the locating survey early in May. The contractor is to commence the grading in 60 days, and it is expected to complete this first section and to have it in operation in time to move this season's crop.

St. Louis & Northern.—Articles of incorporation of the road were filed in Illinois, April 28. It is proposed to build a line from Rock Island to Havana through the counties of Rock Island, Mercer, Henry, Knox and Fulton. The capital stock is $1,000,000. The incorporators and the first board of directors are Isaac L. Morrison, David W. Rider, Weston W. Kerst, William L. Hook and Marcus Hook, all of Jacksonville. The principal office is to be at Jacksonville, Ill.

Saratoga & St. Lawrence Extension.—The company was incorporated in New York state last week to build a road from the northern terminus of the Saratoga & St. Lawrence road at Bombay, Franklin County, to the St. Lawrence River, with a terminus at the province line between the United States and Canada, near the village of Hogansburg. The length of the road is to be eight miles, and the capital stock is $80,000.

Savannah, Americus & Montgomery.—The construction work on the Montgomery extension is about half completed. The track has been laid for about 50 miles from Louvale, Ga., the eastern terminus of the extension. About 30 miles of track has been laid in Alabama since Jan. 1. It is expected to complete the tracklaying to Montgomery by the middle of June, and the line will probably be opened for traffic by Oct. 1. It is 95 miles long. The grading and trestling has been completed on about 80 miles. The bridge over the Chattahoochee River will be finished in August. It has a draw 230 ft. long and fixed spans 330 ft. and 100 ft. long. The foundation work has been built by B. H. Hardaway, and the superstructure is being built by the Edgemoor Bridge Works. The Georgia & Alabama Construction Co. has the contract to build the extension. The following are the sub-contractors: For trestle-work, B. O. Watkins; for earthwork, Bigham Bros., M. Cary, George Jekyll, George C. Vaugnan and T. S. Birscher.

Shuswap & Okanagon.—It is expected that the tracklaying from Sicamous to Enderby, B. C., the southern terminus, will be laid early this month. The contractors have been employing 400 men on the work for the last month. Thirty-six miles of the grading had been finished early in April.

Southern Pacific.—The recent reports that the company proposes to build a branch from Lacoste, Tex., up the Medina Valley to the Llanno iron fields are said to be inaccurate by the General Manager of the company. It is not likely that any branch will be constructed by the company in that part of Texas, and certainly no line longer than 10 miles will be built.

The line from Avon to San Ramon, Cal., 21 miles, is being pushed on toward the latter town at the rate of three-quarters of a mile per day. Track has been laid as far as Wainut Creek, and about ten days will be sufficient to complete the work. Ballasting will follow at once and the line will be ready for operation in May. Kelso & Dare are the contractors.

Tracklaying on the Tracy extension has been finished to Armona, Cal., with the exception of four miles, and the balance will be laid before the bridge over King's River, north of Armona, is ready. The track was laid to Firebaughs last year, and the southern terminus of the extension is 58 miles south of that point. There are to be 10 stations south of Firebaughs, which is at the head of navigation on the San Joaquin River. Seven of the stations have been named. These are: White's, Collis, McMullin, Caruthers, Gillis, Hardwick and Armona.

A Santa Barbara paper recently said, concerning the coast line project, that nearly all the right of way which the towns had promised to secure had been obtained, and that "there now seems every probability that the agreement with the company entered into by the counties of Santa Barbara and San Luis Obispo will speedily be consummated, and it is not unreasonable to suppose that in a few weeks actual construction will be under way between Ellwood and Santa Margarita, Cal.

Springfield, Sedalia, Marshall & Northern.—The articles of incorporation were filed with the Secretary of State at Jefferson City, Mo., last week. The road is to extend from Springfield to Miami, a distance of 145 miles, passing through the counties of Greene, Dallas, Hickory, Benton, Pettis and Saline. The capital stock is $1,500,000. The surveys for the line have been in progress since last March and have been completed from Sedalia north through Dallas County.

Stoneham.—The town of Stoneham, Mass., voted to subscribe $50,000 in bonds, for the construction of this road. It is to be built by the Boston & Maine. The new road will be a double track loop line entering the western division of the Boston & Maine at Middlesex Fells, near Melrose. By the new road to the Fells station the distance to Boston will be nine miles, against 13 miles on the present Boston & Lowell system. The road will not cross any street at grade, there being four overhead bridges. On the old road between Stoneham and Boston there are 17 stations, while on the proposed road there will be nine.

Tacoma Eastern.—The first four miles of the line from the head of Commencement Bay is in operation, and it is expected to have six miles of the line completed early this week. This part of the line will be operated as a lumber and logging road for the present, but it is proposed to extend the line southwest of Tacoma to the Nisqually River, and when the track has been laid to that point the road will be operated as a freight and passenger line.

Tredegar Mineral.—This road is being built by the Jacksonville Mining & Mfg. Co. from Tredegar (Jacksonville), Ala., north to a connection with the East Tennessee, Virginia & Georgia at Iron Mountain. A connection will be made with the East and West of Alabama about three miles north of Tredegar. The line is about 9½ miles long and the locating survey has just been made. The contract for the grading has been let to C. D. Martin, of Jacksonville. The first mile from Tredegar is now ready for the rails. The grading is light, the maximum being 1¼ per cent., and the heaviest curves are six degrees. A trestle 400 ft. long is the only bridgework on the line now under contract. The road reaches extensive mineral lands at Iron Mountain, which are being developed. General J. W. Burke is President and George H. Montgomery, of Jacksonville, is Chief Engineer.

West Virginia Central & Pittsburgh.—The route of the extension, now being surveyed, from Cumberland to Hagerstown, Md., is announced as follows: Beginning at a point on the company's line near Sinclairville, it follows the curve of Knobley's Mountain to a point near the slate bluff of Black's Hill; crosses the Potomac, the Chesapeake & Ohio Canal, and the Baltimore & Ohio Railroad, and through a moderate cut through the Mountain past Black's Hill and eastward through Finksburg; thence to Hagerstown, following for the most part the old Taylor line.

Wiarton Southern.—This is the name of the proposed road from Wiarton, on the Grand Trunk, southeast to Rockford, Ont., near Owen Sound, on the Toronto, Grey and Bruce division of the Canadian Pacific, for which incorporation is asked of the Dominion Parliament. Instructions have been given to proceed to survey the route.

Wisconsin.—The State Legislature has passed a bill incorporating the Oshkosh & Mississippi, and amending the charter of the Wisconsin Central so that it can construct a tunnel in Milwaukee.

Wrightsville & Tennille.—The grading has been commenced for the proposed extension from Dublin, Ga., south. An iron bridge is now being built across the Oconee River from the end of track on the east side of the river to Dublin. The extension has been graded through Dublin parallel to the Macon, Dublin & Savannah, and the track is partly laid down through the town. The survey south of Dublin has been made to Abbeville, 40 miles distant, and the contract for the grading will probably be let this spring.

GENERAL RAILROAD NEWS.

Chicago, Burlington & Quincy.—The gross earnings for March were $2,489,279, a decrease of $671,467 as compared with the same month of last year, and net were $901,542, a decrease of $369,150. For the three months ending March 31 the gross earnings were $7,057,013, a decrease of $1,410,552 as compared with the corresponding period of last year, and net earnings were $2,123,811, a decrease of $891,745.

Chicago, Kansas & Nebraska.—The road was sold at Topeka, Kan., April 29, by the United Seates Marshal to satisfy a $26,000,000 mortgage in favor of the New York Trust Co. The property is appraised at $25,232,000. It was bid in by the trust company for the Chicago, Rock Island & Pacific.

Cincinnati, Hamilton & Dayton.—The stockholders met in Cincinnati, O., April 27, and ratified the lease of the Cincinnati, Dayton & Ironton road, the consideration being the guarantee, principal and interest of $3,500,000 fifty-year five per cent. gold bonds, secured by mortgage on the Cincinnati, Dayton & Ironton. One-half the net income will go to the stockholders of each road. The money is to be applied to the widening of the narrow gauge portion of the Ironton road and for equipment and other improvements.

Covington & Macon.—A hearing was had in the Superior Court, at Macon, Ga., April 21, in the case of the Mercantile Trust Co., of New York. The trust company, representing the bondholders, asked for a foreclosure of the mortgage. Judge Miller granted a decree allowing the foreclosure of the mortgage amounting to $1,475,000 in bonds, principal and interest, and ordered a sale of the road to take place on May 21. The minimum bid must be $1,000,000. The Richmond & Danville and Central of Georgia are practically the bondholders of the Covington & Macon.

Detroit, Lansing & Grand Rapids.—William McRae, of Lockport, N. Y., has just been awarded $91,531 by the Supreme Court of Michigan in a suit to obtain payment for the construction of 56 miles of the road. The demand was mainly for extra cost of construction, due to extensive beds of quicksands whose existence was not known when the specifications of the contract were made.

Long Island.—There was filed in the Secretary of State's office, at Albany, April 27, a certificate of surrender of the capital stock of the New York & Flushing Company to the Long Island, which is now the lessee of the former road.

Maryland Central.—A meeting of the stockholders is to be held at Baltimore, May 5, to effect the formal consolidation of the York & Peach Bottom with this company. The capital stock of that road is $375,000, and the Maryland Central owns $335,000 of the amount. It has leased the road since September, 1889, and now operates it between Peach Bottom and York, Pa., 40 miles.

Norfolk Southern.—The road was sold April 29 at Elizabeth City, N. C., for $500,000, under an order of the United States Court to forclose the lien of the first-mortgage bondholders. The purchasers were Gen. Alexander T. Van Nest and John G. Moore, of New York, who represent the Reorganization Committee of the security holders. The name will be changed to the Norfolk & Southern, and the management will remain the same.

Nova Scotia Central.—Suit has been begun in the Supreme Court at Halifax, N. S., by the Farmers' Loan & Trust Co., of New York, against the railroad company, the plaintiffs claiming $1,065,833. This action is brought to foreclose a mortgage held by the Trust Co. Some time ago the Halifax Banking Co. was restrained by injunction from selling the bonds of the road. The injunction was subsequently dissolved by the full court. Since then the bank has sold bonds for the amount of its claim. The present suit is prosecuted in the interest of the new holders of the bonds, Wade & Eisenhauer, who guaranteed the bonds on the 1st inst.

Texas Central.—This road was sold in Waco, Tex., last week under foreclosure of the mortgage made to the Farmers' Loan & Trust Co., of New York. It was bought by the committee of the bondholders. The price paid was $750,000. The road is operated in two divisions, one extending from Ross to Albany, Tex., 178 miles, and the second from Garrett to Roberts, 52 miles. The foreclosure sale was on 675 miles. The proposed lines extend from Ross to the north state line, 375 miles; from Whitney to the Red River, in Bowie County, 235 miles, and from a point on this proposed line to the Boggy River, in Lamar County, 65 miles.

Union Pacific.—The annual report read at the meeting in Boston gives the deficit for the whole system as $275,036. This loss, President Dillon said, is due to the large increase in the operating expenses. The increase in operating expenses is in part accounted for by the fact that a larger amount of freight was moved at lower rates in 1890 than in 1889. If the percentage of operating expenses to gross earnings had been the same in 1890 as in 1889, the system would have shown a surplus for the year of $2,479,976, after payment of all charges, instead of a deficit of $275,036. Figures for the Union Pacific proper are based upon the same mileage as last year, but the mileage of the Union Pacific system was increased on Jan. 1, 1890, by the addition of the St. Joseph & Grand Island, Kansas City & Omaha, the Oregon Railway & Navigation rail lines, and on April 1, 1890, by the addition of the Union Pacific, Denver & Gulf, and the Pan Handle lines. This brought the mileage of the system up to 7,599, on which gross earnings were $43,049,248, and net earnings $12,238,084 in 1890, against gross earnings of $39,669,600, and net earnings of $13,656,047 in 1889. The percentage of operating expenses to gross earnings was 71.57 against 65.53. The table of operations of the system, however, is made up on the above mileage, plus 388 miles of Central Branch and 175 miles jointly owned, or 87 for Union Pacific—a total of 475, and a grand total of 8,075 miles of rail lines. Union Pacific proper (1,821 miles)—Gross earnings, $20,438,208; increase, $662,652; net earnings, $7,274,750; decrease, $1,001,920; surplus, $1,886,692; decrease, $605,448. Union Pacific system (8,075 miles)—Gross earnings, $44,538,201; increase, $3,597,138; net earnings, $12,389,066; decrease, $1,384,493; total income, $13,420,850; decrease, $930,745; total expenditures, $13,695,887; increase, $320,055; deficit, $275,037, against a surplus of $975,736 last year. The gross earnings per mile from the whole system were $5,515, against $5,069 the previous year, and the net earnings $1,527, against $1,699 the preceding year. The total tonnage was 8,560,000, against 7,478,871 in 1889. The average rate per ton per mile was 1.38 cents, against 1.40 cents; the average rate per passenger per mile 2.336 cents, against 2.41 cents in 1889. During thepast year $301,000 Kansas Pacific consolidated bonds and $7,513,000 Union Pacific sinking fund eight per cent. bonds have been paid from proceeds of land sales, leaving outstanding, $6,530,000 sinking fund eights at close of year. The proceeds of land sales subject to this mortgage will be sufficient eventually to retire all the bonds and leave a surplus to the company of $3,250,000. The estimated value of the lands subject to the Kansas Pacific and Denver Pacific mortgages, contracts, cash, and interest to accrue, $16,986,419. The net decrease in the Union Pacific's funded debt for the year was $8,121,700. The balance to credit of income account, Dec. 31, 1890, was $9,473,989, against $7,714,335 the previous year. The gross floating debt of the company amounted to $21,418,094. Of this $10,162,234 was bills payable, in which item there was a decrease of $2,591,600. The net floating debt was $6,574,941, against $4,489,563 on Dec. 31, 1889, an increase of $2,385,378. The stockholders voted to authorize the directors to issue the proposed consolidation bonds. Jay Gould said: The proposed new collateral trust five per cent. mortgage will be for $25,000,000, but not more than $10,000,000 will be issued at present. It may not be necessary to make any stock bonus with the issue, but, as yet, nothing has been determined about any stock issue. We ought to realize $9,000,000 cash from the bonds. We cannot, under the law, mortgage the main line to Omaha, but the new bonds will cover the Kansas Pacific main line to Kansas City as well as the Kansas Pacific system and the Denver Pacific, which carries the Kansas Pacific to Cheyenne. It will ultimately become a first mortgage upon the Kansas Pacific main line. There are outstanding $5,887,000 Kansas Pacific consolidated mortgage bonds, due in 1890, and the sinking fund now in the hands of trustees, together with the Kansas Pacific lands, will, we figure, amount at the maturity of the bonds to such a sum as will not only pay off these bonds, but leave a surplus of $6,178,000. The new mortgage will also cover the bonds held by the Kansas Pacific trustees. They will also be secured by Union Pacific, Denver & Gulf consolidated five per cent. bonds of which we have $7,137,000 in the treasury; by Oregon Short Line & Utah Northern. Consolidated five per cent. bonds, amounting to $1,811,000; by Oregon Short Line & Utah Northern collateral trust five per cent. bonds $4,631,000, and by other bonds which are set down in the report among our $34,727,000 of bond assets. These bonds will be used as may be needed in the new collateral trust mortgage, and we shall also use the new bonds issued upon the Union Pacific's coal properties.

Wheeling & Elm Grove.—At a meeting of the stockholders of the company held last week it was decided to issue $200,000 of preferred stock at the par value of $50 a share, guaranteed to bear 5 per cent. interest. The issue is made for the purpose of improving the equipment of the road and to relieve some of its indebtedness. The stock will be placed on the market in about a month.

TRAFFIC.

Chicago Traffic Matters.

CHICAGO, April 29, 1891.

Considerable interest centres on the meeting of all the rail and lake lines which has been called in New York to-morrow to discuss the general rate situation. All sorts of rumors have been afloat here regarding the cut in the all rail rates via the "Soo." It is credited to the Fitchburg, to the West Shore and also the Canada Atlantic. There is little doubt that the Great Northern will not only meet these rates, but probably make a lower rate, unless the matter is fixed up at the New York meeting. Pending this conference, the Great Northern has agreed to withhold its reduced tariff.

Chairman Blanchard has furnished the press a statement of the position of the Board of Rulings as regards the payment of commissions by the Alton, in which he says, in part:

"Any one can see that if agents are paid money to sell tickets by a given route the employer is unable to control them or to deal impartially with connections or justly with the public. The commission practice has been the parent of innumerable evils. Divested of sophistry it is simply bribery of servants, and is called so in law and morals when practiced in every other business. Joint relations between railroad companies are matters of contract. . . .

"Our action was taken regretfully and not in any spirit of 'boycott.' We demur to the use of the word. A boycott is an unjustifiable interference with another in the conduct of his own business. We are simply conducting our own business in our own legal way. We do not interfere with the business of the Alton road or with its employés; on the contrary, it is that company which claims the right to interfere with our business and to seduce our employés with money. Its opportunity for doing this has been stopped in the only practical manner. . . .

"It is true that Western companies are permitted by their own rules to pay, but it is general belief that the Alton alone defeats the general cessation of this pernicious practice."

In reply to Chairman Blanchard's statement the Alton has issued a "bulletin," as follows:

Passenger earnings, third week of April, 1890	$35,987
Third week of April, 1891	38,012
Net increase for first week of "boycott"	$2,025

No explanation is offered showing the details of the earnings compared.

The Supreme Court having affirmed the decision of the lower court in the suit of the Illinois Central against the Baltimore & Ohio to recover possession of the freight yards and freight house held by the latter against the wishes of the Illinois Central on the ground that the provisions of a lease which expired in 1884 gave it the right of a renewal, the Illinois Central on April 23 recovered possession of its property by forcibly expelling the Baltimore & Ohio from the premises.

The Chicago & Grand Trunk, Grand Trunk, Lake Shore & Michigan Southren, Michigan Central and Nickel Plate roads have given notice to the Central Traffic Association that they will not agree to the readoption of the rule to accept shipments of fruit and vegetables without prepayment or guarantee, any loss arising from refusal to accept the fruit to be made up pro rata by the roads carrying the same.

The Central Traffic Association has announced a reduction in the rates on iron and steel rails, and articles taking same rates, from Buffalo to Peoria from $3 to $2.25 per ton and from Mahoning and Shenango Valleys to Toledo from $1.40 to $1.35 per ton.

Chairman Finley, of the Western Passenger Association, has ruled that a member of the association must be held responsible for the acts of its connections who may not be members of the association when such acts result in a violation of the association agreement. In the case under consideration a ticket reading from Butte, Mont., to St. Louis, via the Northern Pacific, Chicago, Milwaukee & St. Paul and connections was found to bear a limit one day in excess of the time allowed by the rules of the association, and the St. Paul road was found guilty of a violation of the agreement on the ground that it should see to it that its connections do not pursue any course tending to contravene the agreement. The decision in question is based on this fact, although there were other irregularities in the transaction in question.

The Board of Commissioners of the Western Traffic Association have given notice of the extension of the time fixed by them for the cancellation of the joint tariffs of the Atchison and Rock Island with the Pan Handle, from April 30 to May 30. This gives the interested roads opportunity to have their appeals heard by the Advisory Board at its New York meeting. The Board has also issued a decision in the matter of an appeal of the Southern Pacific from a disagreement in the Rate Committee of the Trans-Continental division in regard to a proposition that the rates on second-class tickets from Pacfic Coast terminals to eastern terminals be made $5 more, and the rates for six months' excursion tickets between the same terminals $10 more than the present rates. The Board orders the authorization of the rates, effective when annouced by the chairman of the Trans-Continental division.

Traffic Notes.

The Southern Pacific now sells 3,000-mile tickets at $75 each.

The Missouri, Kansas & Texas has put on a new sleeping car line between St. Louis and Waco, Tex., via Dallas and Hillsboro.

Large quantities of hay are being shipped from Salt Lake City to Denver, the rate of freight being $7 per ton, and the hay selling in Colorado for $21 to $23 per ton.

Two of the through passenger trains between New York and Chicago, over the West Shore, the Grand Trunk and the Wabash, are to be made faster, the time being shortened about an hour and a half.

Discrimination in Live Stock Rates.

The Interstate Commerce Commission has, in an opinion by Commissioner Bragg, decided the case of Jacob Shamberg against the Delaware, Lackawanna & Western and the New York, Chicago & St. Louis in favor of the complainant. The points decided are briefly as follows:

A firm of cattle dealers in New York, which procured their cattle on a lage scale from Chicago and other Western points for domestic consumption as well as for export, made an arrangement with the road that the firm would, under the name of an express company of their own creation, furnish not less than 200 nor more than 400 improved live-stock cars for the transportation of these cattle. For the rental of these improved stock cars the carriers were to pay this express company three-quarters of a cent a mile. These cars make more than twice the mileage of ordinary stock cars. The carriers were to pay 50 cents for loading at the Union Stock Yards in Chicago. In addition to this the carriers were to pay this firm yardage, at the rate of 3½ cents per 100 lbs. on all their cattle and upon all other cattle hauled for other firms in the care of this firm to its yard at Pier 45, East River, New York. This yardage charge is for keeping their cattle in the firm's own yards after delivery of them to the firm, and then it is deducted from the tariff rate charged by the carrier. The amount of these rebates would more than pay the entire cost of the improved stock cars within two years after operations were begun with them, including the expenses of operation, leaving the firm owning the cars and still operating them with all these advantages in rates and facilities.

It is held, first, that this is an unlawful preference to the firm owning these improved stock cars and a violation of the Act to Regulate Commerce; second, that it is an unlawful and unjust prejudice to competing cattle dealers in New York.

Abolition of Unlimited Tickets.

Vice Chairman Donald, of the Central Traffic Association, has addressed the following circular to the agents of all companies using district, extension and basing passenger rate sheets published by the Central Traffic Association: Commencing May 1, 1891, all unlimited rates quoted in district sheets A, B, C, D, E, F, G, H, I, J and N, basing and extension rate sheets, to points beyond the territory of this association shall be canceled.

Where first-class limited rates are not quoted in any of the above-named publications to points beyond the territory of this association, the lowest unlimited rate shall be used as first-class limited, and tickets shall be limited not to exceed 24 hours beyond schedule time of trains via route of ticket.

In ticketing to points within C. T. A. territory all unlimited rates are canceled where limited rates are quoted via all routes represented.

Pacific Coast rates quoted in the unlimited column of district rate sheets, and limited, by foot note, to 30 days from the date of sale are hereby canceled.

North Carolina Reduces Fares.

The North Carolina Railroad Commissioners have directed a reduction in passenger rates, first-class rates to be 3¼ cents a mile, and second-class 2¾ cents a mile. These rates are to go into effect June 1 next. Reductions are also made in rosin rates, and other slight reductions in freight rates.

East-Bound Shipments.

The shipments of east-bound freight from Chicago by all the lines for the week ending Saturday, April 25, amounted to 54,433 tons, against 60,813 tons during the preceding week, a decrease of 5,380 tons, and against 72,633 tons during the corresponding week of 1890, a decrease of 18,200 tons. The proportions carried by each road were:

	Wk. to April 25		Wk. to April 18	
	Tons.	P. c.	Tons.	P. c.
Michigan Central	7,276	13.4	9,917	16.3
Wabash	5,606	10.3	3,885	6.4
Lake Shore	7,219	13.3	8,184	13.4
Ft. Wayne	6,194	11.4	5,453	9.0
Panhandle	7,342	13.5	6,869	11.2
Baltimore & Ohio	2,299	4.2	3,872	6.4
Chicago & Grand Trunk	6,904	12.6	7,361	12.1
Nickel Plate	5,107	9.4	6,869	11.3
Chicago & Erie	6,495	11.9	8,476	13.9
Totals	54,433	100.0	60,813	100.0

Of the above shipments 4,813 tons were flour, 25,872 tons grain, 3,792 tons cured meats, 1,254 tons lard, 6,446 tons dressed beef, 1,001 tons butter, 898 tons hides, 100 tons wool and 6,978 tons lumber. The three Vanderbilt lines together carried 36.1 per cent., while the two Pennsylvania lines carried but 24.9 per cent. The lake lines carried 65,923 tons.